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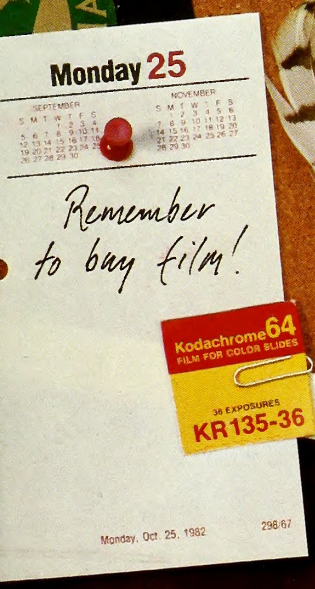
BIENNIAL REPORT ISSUE

JULY 1, 1980 – JUNE 30, 1982



North Carolina
Wildlife
Resources Commission

Archdale Building, 512 N. Salisbury Street, Raleigh, North Carolina 27611, 919-733-3391

His Excellency, The Governor of North Carolina
Members of the General Assembly
Raleigh, North Carolina 27611

Dear Sirs:

I am pleased to present to you the 18th Biennial Report of the North Carolina Wildlife Resources Commission. This report, which is for the period beginning July 1, 1980 and ending June 30, 1982, reflects the Commission's activities and accomplishments during this period.

These two years have been significant ones for the Wildlife Commission, in some ways more so than previous reporting periods. The Commission successfully underwent the major portion of an extensive reorganization during the biennium, and these changes have been reflected in a number of beneficial results. In the continuing search for funds to maintain and improve services at a time when monies are more scarce than ever, the Commission developed and inaugurated the Wildlife Endowment Fund which has already passed the $1 million mark in participation. Through the use of advisory committees, greater citizen input has been achieved along with more widespread public support. These committees have also helped us financially.

The recently ended biennium has seen two years of progress of which we are proud, yet without your continued support, and that of the Legislature, these strides would never have been possible.

We welcome your continued support and suggestions, and we look forward to working together to meet challenges in the years ahead.

Respectfully yours,

J. Robert Gordon

J. Robert Gordon

January, 1983
Volume 47, No. 1

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

Ken Taylor / March, 1982 issue

Biennial Report Issue

July 1, 1980—June 30, 1982

CONTENTS

2 **Two Years Of Progress**

4 **Division of Enforcement**

8 **Division of Wildlife Management**

14 **Division of Inland Fisheries**

20 **Division of Conservation Education**

24 **Division of Administrative Services**

30 **Other Services**

Cover *A bulletin board in the Division of Conservation Education is likely to reflect almost the entire range of activities, interests and responsibilities of the North Carolina Wildlife Resources Commission. Of course, this bulletin board was arranged solely for the photographer, but it symbolizes many of the Commission's major accomplishments during the biennium. Photograph by Ken Taylor.*

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Two Years Of Progress

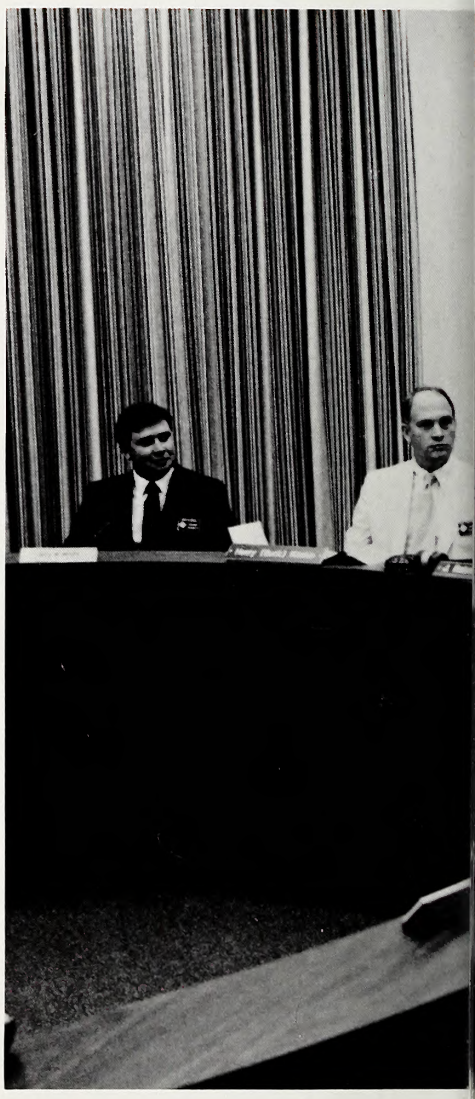
Vernon Bevill became executive director of the North Carolina Wildlife Resources Commission on July 10, 1980 just as the 1980-82 biennium was beginning. Two of the most critical problems facing Bevill, the board of appointed Commissioners and the Commission's professional staff were a severe shortage of funds and how to improve program services to the public. Now, more than two years later, progress has been made on both fronts.

Though the financial picture is still far from bright, there are promising signs that some of the efforts to alleviate this problem are working. Also, public support for the agency has improved greatly.

Among the most significant achievements during the biennium have been the successful implementation of the Wildlife Endowment Fund with its lifetime licenses and provisions for donations, and the establishment and intensive use of a series of citizen advisory committees. The Endowment Fund holds special promise for aiding the financial status of wildlife programs over the years to come, and has also been well-received by sportsmen because it is a good deal for them and a good deal for wildlife as well. The citizen advisory committees — made up of many successful businessmen from across the State with an interest in wildlife and the environment — have also worked well, uniting various factions toward a common goal and providing sound advice from the business and sporting communities.

The Wildlife Commission has also worked very closely with the State Legislature during the biennium, and has received invaluable support on many vital issues, financial and otherwise. For example, at the beginning of the biennium, the long-sought revision of the game law became effective (July 1, 1980), and the license provisions followed a month later. Through close cooperation between the board of Commissioners, the professional staff, the legislature and the Governor's office, a number of meaningful wildlife bills were passed, some of which will help set the stage for other means of overcoming financial problems and improving wildlife programs. With the continued interest in and support of the Executive Branch and the Legislature, further strides are anticipated.

Ken Taylor



During the 1980-82 biennium, the Wildlife Resources Commission, under Executive Director W. Vernon Bevill (above), initiated the Wildlife Endowment Fund which has already generated over $1 million, the interest from which is used for Commission conservation programs. Governor James B. Hunt Jr. received his lifetime sportsman's license in 1981 (right) from J. Robert Gordon, chairman of the Wildlife Commission.

One very important factor in the overall progress made during the biennium has been the major reorganization of the Wildlife Commission's professional operation. The most important parts of this reorganization are outlined in the various division reports in this issue, but perhaps the key result of this reorganization has been the involvement of more people and more ideas, and greater teamwork in the implementation of programs.

"I think that the management team approach has gotten more people with field-oriented responsibilities involved in the decision-making process," said Bevill. "With the increased involvement of these people and the improved regulation development and review process by our regulations committee, more people are putting their heads together to find viable alternatives and programs that can serve greater needs. More field personnel involvement should serve to improve the morale of the professional staff, enhancing the flow of information and creative ideas.

"Our citizen advisory committees are a vital part of this approach, and they have allowed us to draw good ideas from the private sector and also improved our public support," said Bevill. "This has allowed us to incorporate sound business decisions into our overall program.

"In a large measure, the proof of this approach may be still a year or so away, but

Ken Taylor

it certainly looks promising at this stage," continued Bevill. "Already, we can see beneficial results. We now have a very supportive constituency and improved enthusiasm throughout the professional staff. As part of the result, we've had two years of very good public hearings, and I think that's a function of the way we're doing our jobs."

Bevill sees the success of the Wildlife Endowment Fund as a prime example of the effectiveness of wider input and cooperation between the professional staff, the board of Commissioners, the advisory committees and others.

"The Wildlife Endowment Fund has just recently passed the $1 million mark, and it stands as a solid monument to the kind of creativity we must use to finally resolve such key issues as adequate funding," said Bevill. "This program, through its provisions for lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina* magazine and donations, offers something of immediate and lasting value to sportsmen and citizens and, at the same time, ensures a sound and promising base for the future of wildlife programs in North Carolina. Already, other states are looking carefully at our program because they see its almost unlimited potential. We all can be proud that we have spearheaded such a successful program.

"I also think the future bodes well for this State's wildlife programs on other fronts as well," added Bevill. "As we evolve the new passbook license program, this will be another step in the right direction, and this idea was formulated during this recently ended biennium. The basic work, including the passage of enabling legislation for this new type of license, was accomplished during the biennium — still another example of the cooperative approach.

"During this biennium, we have put a lot of good ships on the sea," said Bevill. "In addition to the Endowment Fund and the passbook license, we have set up the means for a waterfowl and sportsman's stamp, and laid some groundwork for a possible income tax checkoff for wildlife. We also have the potential for about $\$1/2$ million in additional federal aid through an expansion of the Dingell-Johnson Act, as well as some possibility of renewed limited funding of the Endangered Species Act if Congress acts favorably on these matters. "These and other items offer positive potential, and we want to continue to maximize this potential through hard work. I believe, more than ever, that this is now possible because we're much closer to being one agency with a common goal than we have ever been.

"Of course, all the progress we have made in this past biennium could be lost if we don't remain keenly aware of how much work it took to get this far," added Bevill. "We've got the basic support we need and the elements to operate a successful program, but we must continue to work hard. Yes, I must confess I am confident. We've come a long way, and although there is still a long way to go, I am confident we will not only survive, but provide a better overall wildlife program in the years ahead. The dedication of our employees is such that we like to succeed and thrive on challenge. I'm looking forward to the future because I think that we are ready for the challenges that await us.

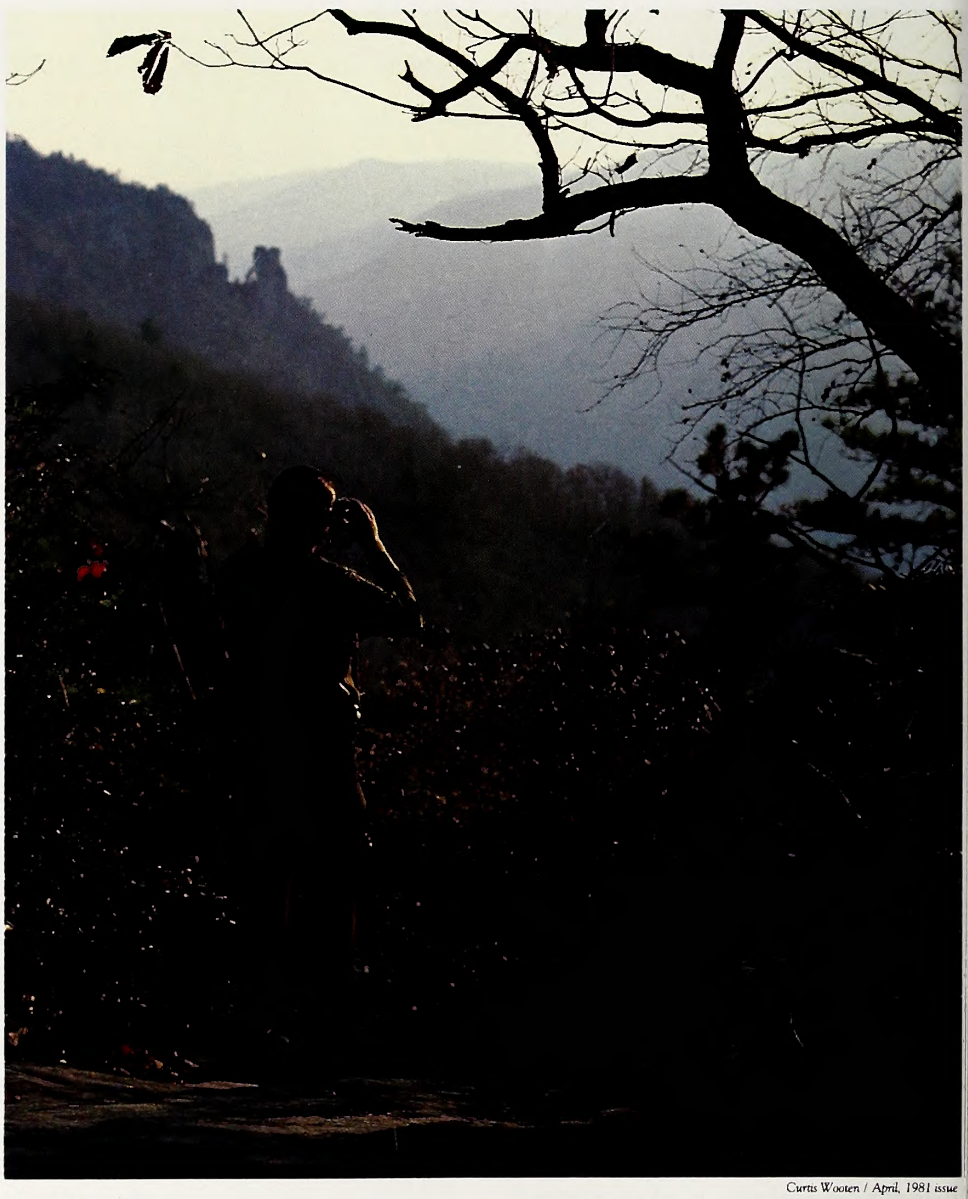
Division of Enforcement

Few forests, lakes or country roads in North Carolina have not been visited by wildlife enforcement officers, whether on foot, by car, four-wheel drive vehicle, boat or flown over in aircraft. These men are on the job day and night from the coast to the mountains enforcing laws that protect certain wildlife and fish species. They also enforce laws that allow for an equitable harvest of other species by hunting, fishing or trapping, and that ensure boating safety on the State's waters. During the past biennium, the officers of the Division of Enforcement engaged in a wide variety of routine and special duties, and updated their procedures in several areas.

Wildlife Watch

The Wildlife Resources Commission has long recognized that it would be impossible to provide adequate protection to the wildlife resources of North Carolina without support and assistance from its citizens. The Wildlife Watch program, begun in the last biennium to make it easier for citizens to report wildlife law violations and obtain information, was so successful that by 1981 it was necessary to install an additional line to the existing toll-free WATS (Wide Area Telephone Service) system. Over 6,000 calls are received in some heavy hunting and fishing months, and on heavy-use days like Thanksgiving and the opening day of trout season two officers man the phones.

Under the Wildlife Watch program, any person who becomes aware of a violation of the hunting, fishing or boating laws is encouraged to report it by calling 1-800-662-7137, toll-free. During the hunting season, trained officers are on duty 24 hours a day to relay this information to wildlife officers in the field. During the remainder of the year, the phone lines are manned from early morning until late at night. Frequently, information can be relayed by radio to officers in the field who can often be at the scene of the reported violation in a matter of minutes. All information concerning violations is held in strict confidence.



Curtis Wooten / April, 1981 issue

Operations

The activities of wildlife enforcement officers include ensuring that hunters and fishermen conform to established seasons and bag and creel limits, investigating the hazardous operation of boats, and working undercover. Special emphasis was given during the biennium to apprehending those involved in the commercial exploitation of the State's wildlife, particularly market hunting and illegal dealings in fur. Increased emphasis was also placed on patrolling the traditional high-use hunting and fishing areas of the State.

The authority to issue warning tickets for minor infractions of the wildlife and boating law was granted to wildlife officers by the General Assembly during the biennium. Warning tickets are being issued only in those cases where the wildlife resource has not been harmed or public safety infringed upon. This new discretionary authority is significant because a warning ticket requires no follow-up or time in court. This has freed a considerable amount of the officer's time to concentrate on more serious violations. It has resulted in a higher arrest and

Ken Taylor

Tim Hergenrader

conviction rate for serious wildlife law violations.

Organized wildlife law violators often use sophisticated methods to conceal their activities — methods which require sophisticated procedures and skill to detect. To learn those procedures and skills twelve of North Carolina's wildlife enforcement officers attended the federal school for undercover officers in Glenco, Georgia during the biennium. A good part of wildlife law enforcement is effective surveillance and, as in previous years, the Commission's four aircraft are relied upon to improve the efficiency and effectiveness of law enforcement surveillance. Often surveillance and undercover work lead to evidence of the illegal shipment of wildlife or parts of wildlife (carcasses, fur, etc.) out of state. The interstate shipment of illegally taken wildlife is a violation of federal laws and regulations that are under the jurisdiction of agents of the U. S. Fish and Wildlife Service. A close working relationship with federal agents has evolved and the resulting teamwork has resulted in the apprehension and conviction of persons involved in major state and federal wildlife law violations.

Wildlife law enforcement is dangerous work. Studies have shown that wildlife officers are nine times more likely to be killed in the line of duty than any other law enforcement officer. In November 1980, Officer Lloyd Mayse, stationed in Northampton County was killed while trying to apprehend two persons he caught firelighting deer. His tragic loss sparked a review of procedures for apprehension of suspects and other safety procedures.

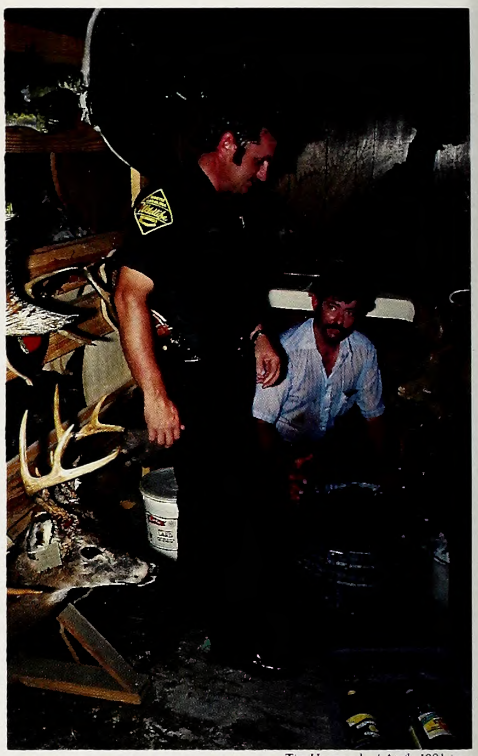
The following is a summary of enforcement checks, violators caught and convictions, during the reporting period.

- — Number of hunters, anglers, trappers, etc. checked — 580,631
- — Number of violations — 22,210 violation rate 3.82%
- — Number of convictions — 19,476 conviction rate — 87.69%
- — Number of boats inspected — 137,635
- — Number of violations — 6,355 violation rate — 4.62%
- — Number of convictions — 5,747 conviction rate — 90.43%
- — Number of hours on patrol, game and fish laws — 564,095
- — Number of hours on patrol, boating laws — 34,565

From the mountains to the sea, wildlife enforcement officers are on the job seeing that the laws protecting wildlife are obeyed. Some officers also provide hunter-safety instruction to thousands of school children every year. Hunter-safety instructor Ken Kraft (left) scores a target in one of the 1982 hunter-safety tournaments. In 1982, a nature trail in Tanglewood Park (right, above) was dedicated partly to the enforcement officers who lost their lives in pursuit of their duties.

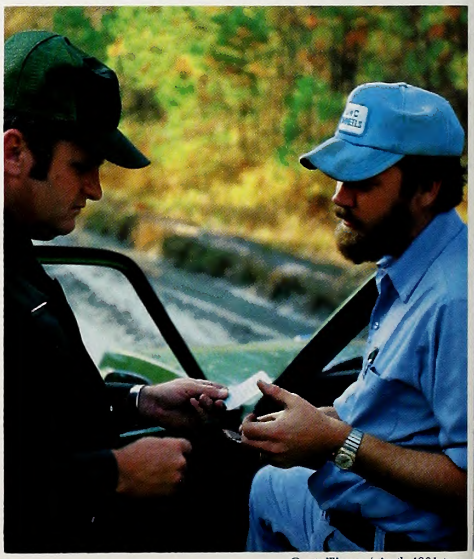
Division of Enforcement

Ken Taylor



Tim Hergenrader / April, 1981 issue

Enforcement officers rarely have to use their guns, but target practice (left) and other training enable them to protect themselves in potentially hazardous operations. In a recent case, enforcement officers helped "bust" an eastern taxidermist who specialized in wildlife species protected by state and federal statutes (top). Officers in the field keep in contact with the Raleigh office through a telephone system (right).



Curtis Wooten / April, 1981 issue

Ken Taylor

Service Agents

A critical link between the Wildlife Resources Commission and the sportsmen of North Carolina are the wildlife service agents — the hardware, sporting goods and country stores, boat dealerships and similar businesses across the State that sell hunting, fishing and trapping licenses, register boats and provide information to the public. A closer working relationship between officers in the field and the service agents was established during the biennium to ensure that the agents have the supplies and information they need to serve the sporting public.

Safety Officers

The Safety Section of the Division was expanded during the biennium in order to extend the scope of the Commission's Firearms and Hunter Safety Program and its Boating Safety Program, and to improve the efficiency of their administration. The four existing firearms and hunter safety officers were joined by five additional officers in 1981 and their responsibilities expanded to include both firearms and hunter-safety education and boating-safety education. Each of the State's nine wildlife districts now has a safety officer who coordinates the outdoor-safety programs in the district.

There were 61,626 students trained in firearms and hunter safety during the past two years — a 20% increase over the previous biennium. And there are now some 1150 volunteer instructors statewide who have been trained to present the firearms and hunter-safety program to interested groups. During the period, 50 hunting accidents were investigated by wildlife officers, with 16 of those involving fatalities.

The boating-safety education course, designed to teach the fundamentals of safe boating to young people was completed by some 160,000 junior high school students during the biennium.

Other Public Services

Aside from their duties enforcing hunting, fishing and boating laws, few people are aware of the many other services provided to the people of North Carolina by wildlife enforcement officers. Possessing a thorough knowledge of lakes, rivers and forest areas, these officers are called upon regularly to lead search and rescue operations. They assist in forest fire detection and control, monitor hazardous materials in emergencies, investigate industrial spills involving fish kills and assist with hunter-safety education, conservation education and other activities.

Division Of Wildlife Management

Karl Maslowski / November, 1980 cover

Coping with the complex problems of game management with increasingly scarce resources: that was the challenge of the 1980s reported by the Division of Game in its last biennial statement. "To assist the Commission in meeting this challenge," we wrote, "we must revise programs, seek more efficient management techniques, and achieve the greatest possible economy in division operation."

The division took a giant step toward meeting these goals when it reorganized its activities, programs and personnel in 1981 as part of the Commission-wide reorganization. The reorganization is intended to employ more efficiently our professional staff of biologists, foresters, technicians and administrative support. They will continue to serve the Wildlife Resources Commission, and the people of North Carolina, by providing the necessary research to support sound hunting regulations, and by managing game habitat across the State. But now the division will also incorporate newer emphases on nongame species and nonhunting wildlife recreation.

As a result of this reorganization, the Division of Game has become the Division of Wildlife Management. Its activities have been grouped into two sections, the Land Management Section, and the Research and Regulations Section. Key personnel have been positioned strategically to give the division better long-term planning, a capability it has not had before. Three on-going task forces have been created, staffed by personnel from several divisions: The Big Game Management Team, the Small Animal and Migratory Bird Management Team, and the Land Management Working Group. In these groups selected biologists, enforcement officers and education personnel convene periodically to consider problems and make recommendations. The new organization will help streamline the division's operations without impairing its mission.

Here are some of the major accomplishments of the Division during the past biennium.

Land Management Section

The Land Management Section has two goals: to provide technical guidance to landowners interested in managing their wildlife habitat, and to manage the Game Lands Program.

Ken Taylor

Deer Project Leader Scott Osborne talks to many deer hunters through the year, and the Dixie Classic provides a good opportunity to share information with deer hunters about deer populations and good management (above). In the Sandhills, as part of an ongoing fox squirrel study, a biologist checks a nest box made of old tire casing.

Terry Shankle

The technical guidance program has always been important, but efforts are being increased to assist the small landowner. There are approximately 225,000 small landowners across North Carolina and with habitat loss continuing to be a problem it is important that the Division mount vigorous programs to protect and enhance the habitat that remains. Nine district biologists worked with 1,200 small landowners during the biennium, offering guidance in burning woodlands for wildlife management, planting food plots, leaving oak trees for deer in clearcut areas, arranging brush piles for rabbit cover, seeding plants that offer cover for quail and rabbits, and other management practices.

With only nine district biologists, however, a cooperative approach is being emphasized. Game biologists are joining

Division Of Wildlife Management

personnel from the Division of Forest Resources, the Agricultural Stabilization and Conservation Service (ASCS), the Soil Conservation Service (SCS) and other State and federal agencies to reach out to the small landowner as one unit. One example of this approach has already borne fruit. In each county small interagency woodlot committees are being set up in which biologists and others put on demonstrations, give tours, and disburse technical information.

During the last biennium planting materials were provided to approximately 15,000 cooperators — 65,000 units of annual seed mixtures and 10,000 units of perennial mix, each unit sufficient to plant 1/8 acre. These mixtures will improve wildlife habitat on small as well as large landholdings.

Staff personnel also expended 1,500 man-days assisting landowners in reviewing permit applications for dredge-and-fill and other water-related development projects, for habitat planning and farm reviews.

Participation in Project RENEW was increased during the biennium from 437 cooperators to 689, and from 117,633 acres to 181,428 acres. The RENEW program is a cooperative arrangement by which private land is provided to sportsmen through a permit system, and biologists assist cooperating landowners in improving wildlife habitat on their lands.

The Game Lands Program has not changed with the reorganization, although its administration has. This is another cooperative arrangement by which the Wildlife Commission, various State and federal agencies, corporations and small landowners provide land for public hunting and fishing. During the biennium, over 200,000 hunters bought Game Lands licenses to hunt in 98 game lands comprising nearly 2 million acres.

Over the last two years division personnel managed these game lands to provide quality hunting for North Carolina sportsmen, maintaining over 4,000 acres of waterfowl impoundments, 800 miles of

Eugene Hester / September, 1981 issue

Luther Partin / September, 1980 issue

Curtis Wooten

Techniques for estimating wildlife populations are important for proper management. Biologists Randy White and Denny Baumbarger (left) instruct western area biologists in scent post techniques, a way to estimate the populations of furbearing species. Squirrel and dove populations are up in North Carolina.

access roads and 1,800 miles of boundaries. In addition, they seeded 3,310 acres of wildlife food plots, fertilized 5,656 acres of grassy openings, and produced 87,503 units of seed. A total of 125 squirrel nest structures were erected on several game lands, and 150 others were maintained.

The forestry program on state-owned lands is an important part of the Game Lands Program. Four foresters work in this area to demonstrate that good forestry practices can increase wildlife populations. As part of this program, almost 4 million board feet of timber, 1,347 tons of pine straw, 1,762 tons of pine stumps were harvested, and 800 firewood permits were issued. From these activities the Commission gained revenues of $539,107.

Another important part of the division's forestry program is the use of controlled burns on game lands in order to improve wildlife habitat. Such burns remove litter from the forest floor, open up the understory to the growth of leguminous plants and help prevent the spread of forest fires. During the biennium foresters control-burned 25,000 acres of habitat.

Additional funds during this period enabled foresters to improve the reforestation program from 100 acres reforested in the first year of the biennium to 566 acres in the second year. Reforesting 500 to 600 acres annually is anticipated.

Research and Regulations Section

The main goal of this section is to provide the necessary investigations into wildlife populations to support sound hunting regulations, and thus to manage the game species placed in our trust. Past experience has proved that there were many complex problems — the periodic occurrence of disease in deer herds, for example, or the mysterious fluctuations in the grouse populations — that could not be dealt with by anything less than a full-time effort. Thus under the reorganization plan, two programs were set up: the Big Game Program and the Small Game and Nongame Program. In these programs seven specially trained project leaders were assigned full-time responsibility to gather information and provide long-range planning recommendations concerning the management of deer, wild turkey, black bear, small game, migratory waterfowl, webless migratory birds, and nongame furbearers. These project leaders will give continuity to division planning over the coming years.

During the biennium work was begun and finished on a number of projects dealing with both big game and small game. Biologists monitored the condition of deer herds in 33 areas by means of Abomasal Parasite Counts (APC). A total of 145 deer were relocated to mountain restoration areas. Two new harvest programs were implemented in efforts to manage overpopulated herds. The first was a permit system allowing sportsmen to harvest either-sex deer on selected game lands. Approximately 6,000 hunters applied for these permits each year of the biennium. The second program allowed qualified landowners or hunt clubs to harvest a specified number of antlerless deer beyond the time set forth in the regular either-sex season. This program was tested in the 1981-1982 season and the nine hunt clubs participating in the pilot study harvested 394 antlerless deer.

Wild turkey restoration efforts

Division Of Wildlife Management

continued during the biennium. A total of 140 wild turkeys were live-trapped and relocated to 10 restoration areas throughout the State. The spring gobbler harvest rose from 293 reported kills in 1981 to 384 in 1982, a 31 percent increase. Steadily improving harvest figures reflect the success of the restoration program. Soon several areas stocked only a few years ago will provide additional sources of turkeys for further stocking programs.

There are about 2,500 bears in North Carolina and the population is growing despite accelerated habitat destruction due to the conversion of forest land to agricultural fields. During the biennium biologists examined bears harvested by hunters or road-killed bears to determine sex and age. By obtaining accurate life history data from these animals, biologists can manage the bear population to allow removal of surplus animals by hunting.

Several small-game projects received the division's attention during the past two years. One recently completed project looked at the ways cottontail rabbits have adapted themselves to modern clean-farming practices. Miniature radio transmitters attached to the rabbits allowed biologists to monitor their movements. The study has yielded new ideas on improving rabbit habitat on clean farms. A rabbit research and habitat demonstration area is being established in Durham County on a portion of the Falls of the Neuse Game Land. This area is designed primarily to demonstrate the best management techniques for rabbits.

Starting this fall, the Commission plans to monitor the small-game harvest on popular areas like the Sandhills. Hunters using this area will be asked to mail in a wing from each quail they kill in special envelopes provided by the Commission. Information gained will help biologists monitor the effectiveness of their management practices.

A cooperative Canada goose research project was developed with several Atlantic Flyway states in order to determine why the number of geese that migrate to North Carolina is decreasing and how this trend can be reversed. North Carolina hunters harvested 212,598 ducks in 1980 and 220,177 in 1981.

During the biennium, "scent post" surveys were continued in order to monitor fox and bobcat population trends. Biologists prepared long-range plans and goals for furbearer management in North Carolina. Biologists also worked on strategies for problem beavers, and began planning on a Trapper Education Program.

Fur Harvest Report

Species	1977-78	1978-79	1979-80	1980-81	1981-82	Percent Change From 1980-82
Beaver	446	363	776	943	1,078	+14.3
Bobcat	593	860	727	874	514	−41.2
Groundhog	59	61	120	82	6	−92.7
Mink	2,176	2,232	2,611	3,817	1,692	−55.7
Muskrat	52,620	55,630	70,775	83,269	48,468	−41.8
Nutria	2,577	2,235	2,663	1,938	743	−61.7
Opossum	16,540	21,592	33,637	16,413	8,090	−50.7
Otter	927	1,304	1,618	1,679	870	−48.2
Raccoon	72,242	88,774	98,968	112,420	88,122	−21.6
Skunk	447	856	716	390	91	−76.7
Weasel	60	125	137	89	24	−73.0
Rabbit	54	6				
Fox	10,228	10,715	13,185	4,427	222	−94.9
Other	397	87	156	39	0	−100.0

Curtis Wooten

In places where deer populations are high, deer depredation is a persistent problem. In this Pender County corn field (left), a game biologist checks depredation after being summoned by a farmer. Biologists also give technical guidance to farmers interested in improving their wildlife habitat.

Karl Maslowski / January, 1980 issue

Mid-Winter (January) Waterfowl Counts in North Carolina

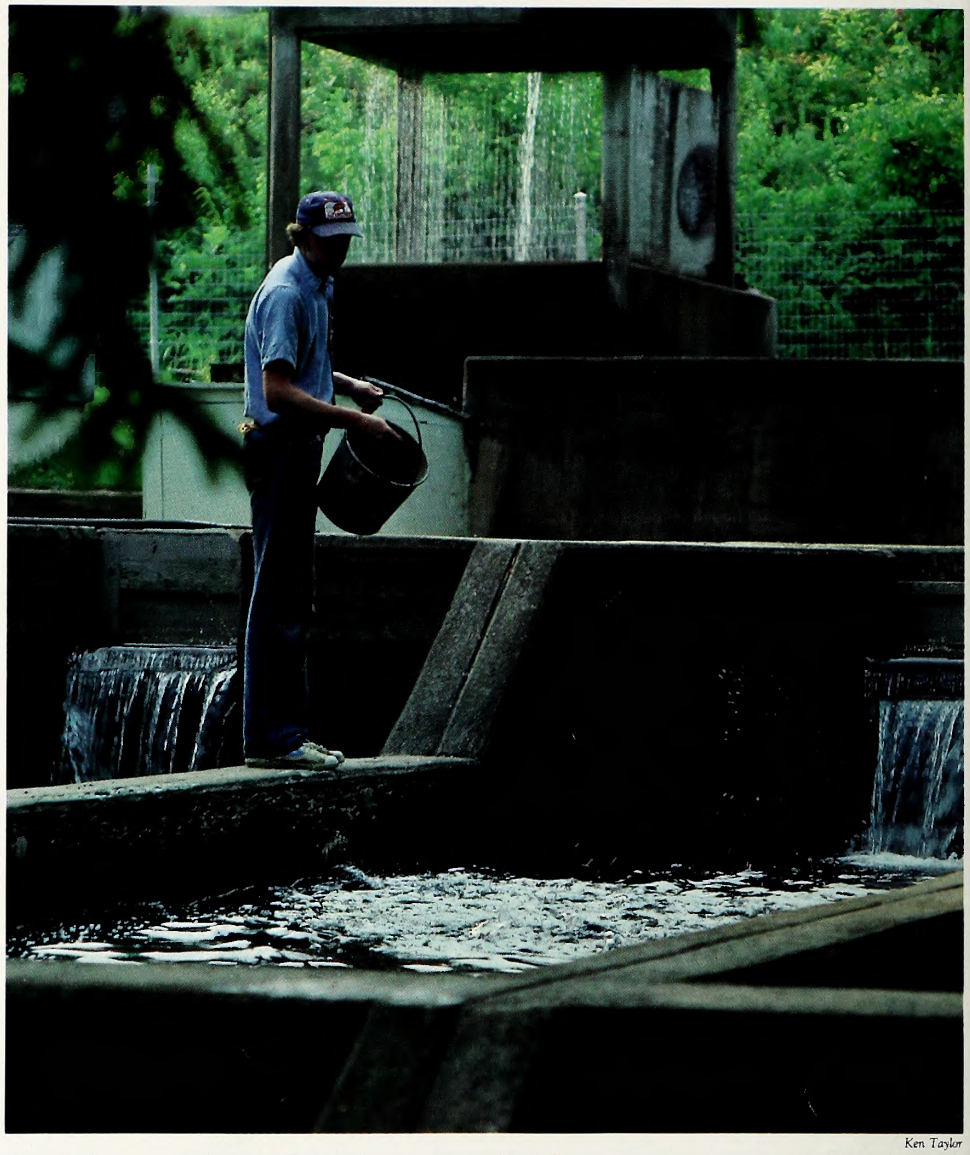
Species	1976	1977	1978	1979	1980	1981	1982
Dabbling Ducks	173,100	186,800	166,000	117,600	69,200	138,300	111,900
Diving Ducks	120,200	153,500	155,600	299,700	194,400	190,300	100,900
Mergansers	5,400	2,900	1,100	4,300	17,400	4,100	6,600
Coots	215,700	80,100	49,700	31,800	61,400	21,000	9,400
Sea Ducks, Miscellaneous & Unidentified	1,900	7,500	14,100	4,000	4,500	15,300	4,900
Whistling Swan	41,700	43,300	23,800	30,500	19,700	46,600	42,200
Canada Goose	63,200	67,900	55,500	42,100	28,600	47,700	37,400
Snow Goose	57,800	52,300	30,300	34,900	16,300	45,900	25,200
Brant	200	500	4,000	0	1,500	7,500	3,400
Totals (All Waterfowl)	**679,200**	**594,800**	**500,100**	**564,900**	**413,000**	**516,700**	**341,900**

Division Of Inland Fisheries

Managing North Carolina's fisheries to produce recreation for growing numbers of anglers is the challenge that continues to face the Wildlife Commission's Division of Inland Fisheries. Water pollution from industrial wastes, agricultural runoff, and sedimentation contribute to this problem.

To help meet this challenge, the Division of Inland Fisheries is divided into two sections. The Research and Management Section is responsible for maintaining and enhancing the freshwater fisheries of the State. Research biologists conduct surveys, population samples, and develop management strategies for our fisheries. The Fish Culture Section operates five fish hatcheries throughout the State which provide many of the fish needed for stocking and restoration programs. These two sections work closely together. Funds for fisheries programs are obtained from two sources. Research and management programs are often funded by the Dingell-Johnson program — a federal excise tax of 10 percent on various sport-fishing items — with matching State monies. Other programs are supported by State fishing license revenues.

As part of the recent reorganization of the Wildlife Comission, inter-agency task forces were created dealing with black bass (largemouth, smallmouth and spotted bass), trout, striped bass and technical services. These task forces develop guidelines for management of fisheries, and help coordinate a series of comprehensive research and management programs which are listed in the following pages.



Ken Taylor

Largemouth Bass

The largemouth bass is the most popular game fish in the State, and the biggest change made in bass management in recent years has been the establishment of the new 14-2 regulation in this biennium. This regulation sets a minimum length limit of 14 inches on black bass, but allows anglers to keep two under-sized fish in the eight-fish daily creel limit. Widespread concern about the decline in bass fishing in North Carolina during the early 1970s prompted a series of studies that led to the establishment of this regulation.

One of the first signs of the declining bass fishery was determined through the bass-catch survey. Since 1976, cooperating bass fishermen have sent in reports after each fishing trip showing the numbers of fish caught and the hours spent fishing. This information is used to determine angler-success rates. In 1976, the study showed that anglers fished for an average of four hours to catch a legal-sized bass. In subsequent years the success rate dropped steadily, and in 1980 anglers fished an average of over five hours to catch a legal-sized bass. This study will continue.

From 1978 through 1981, "trophy" regulations were established on four Piedmont lakes to determine if heavy fishing pressure was harming bass populations. A minimum-size limit of 18 inches for largemouth bass was established on lakes Tillery, Thom-A-Lex, Higgins and Cane Creek. Biologists monitored bass populations in these waters, and found that the three lakes responded favorably.

An exploitation study of largemouth bass was conducted on Badin Lake, a typical Piedmont reservoir, between 1980 and 1981. Biologists tagged and released approximately 1,000 bass in the lake. Tag returns from anglers showed that over half of the bass in Badin Lake were being caught annually, although many of these fish were released. A similar study is

Jim Dean / April, 1980 issue

Curtis Wooten

Freshwater trout are raised at Wildlife Commission hatcheries (left) and stocked into streams and lakes in the western part of the State. A technician fertilizes trout eggs by stripping milt from a male trout (below). The result of this program is more trout like this handsome rainbow (above) in our public waters.

currently being conducted on Lake Norman. Also, a creel survey — which determines fishing pressure and the numbers of fish harvested — was conducted on Badin Lake with the exploitation study. The creel survey showed that there was as much fishing pressure in the first three months of the study in 1980 as in all of 1972, when a similar survey was done.

All of this research played a key role in the development of the 14-2 regulation. The 14-inch minimum-size limit is designed to increase the numbers of mid-sized fish (as trophy regulations did) while allowing anglers to keep two under-sized fish, and thus utilizing the vast numbers of small bass found in many waters. Natural mortality is very high in these young fish. Eventually, this regulation should result in more balanced bass populations. The effect of this regulation on bass populations will be closely monitored for several years.

A study of coastal largemouth bass in rivers and brackish waters was also conducted during the biennium. Biologists found that bass in coastal rivers have slow growth rates. In the Trent River, for example, it takes bass about five years to grow to 12 inches compared to three years in most reservoirs. In contrast, largemouth bass in brackish waters have faster growth rates. In Kitty Hawk Bay, bass reach 12 inches in about three years. Spot and croaker were the dominant forage fish for bass in brackish waters, while crustaceans were also an important food source. The high levels and diversity of aquatic organisms in brackish waters are responsible for accelerated growth rates.

Efforts are under way to establish new bass fisheries. In 1982, for example, the newly built B. Everett Jordan Reservoir near Raleigh was stocked with 500,000 largemouth bass, 650,000 bluegills, and 350,000 red-ear sunfish. Panfish provide a food source for largemouth bass, and are also popular with anglers.

Bass fishing may be enhanced by improving habitat quality, especially in man-made lakes and reservoirs where natural cover for forage fish and bass is often lacking. The Division of Inland Fisheries has worked cooperatively with the U. S. Army Corp of Engineers to improve bass habitat in the B. Everett Jordan and Falls-of-the-Neuse reservoirs. In these waters, standing timber and logs chained to stumps were left in certain areas to provide additional cover for fish. Artificial reefs made of old automobile tires were placed in the Falls-of-the-Neuse Reservoir near Durham, and have also been placed in many other lakes throughout the State during the past biennium. These projects are often undertaken with the help of local sportsmen's clubs.

Inland Striped Bass

The stocking of striped bass in inland reservoirs is a popular program. These fish grow to trophy size quickly — reaching five to 10 pounds in a few years — and over a half-million fingerlings are obtained from federal fish hatcheries and stocked annually in 10 Piedmont reservoirs.

The striped bass is a large, schooling, open-water predator that is able to take advantage of the large shad populations found in the open expanses of many reservoirs. Consequently, there is little competition for food or cover between largemouth bass and stripers. Keeping shad populations in check also results in more food for bass and other game fish.

Division Of Inland Fisheries

Urban Fishing Programs

North Carolina, like other sunbelt states, has experienced rapid growth in recent years, and changes are most evident near large cities. The Division of Inland Fisheries is conducting two programs designed to improve fishing opportunities in urban areas.

Striped bass-white bass hybrids have been stocked in urban lakes near Rocky Mount, Burlington, Greensboro, High Point and Concord. About 80,000 of these fingerlings are raised and stocked annually from the Wildlife Commission's Fayetteville Fish hatchery. These fish grow rapidly, and are not reluctant to strike.

Another program is designed to improve fishing in the hearts of urban areas. Fingerling channel catfish are placed in cages in ponds in municipal parks, and are grown to catchable size — about a pound — before being released. The Wildlife Commission furnishes cities with technical assistance, and provides the fingerling catfish which are raised at the Fayetteville fish hatchery. Park officials are responsible for feeding and caring for the catfish after they are placed in ponds.

This program is very popular, and has been conducted in Durham, Sanford, Greensboro and Charlotte. Through this urban fishery, outdoor recreation is offered to inner-city youngsters, low-income people, and the elderly.

Curtis Wooten

Jim Dean / February, 1981 issue

Electro-shock techniques permit fisheries biologists to temporarily stun fish in lakes to check populations and collect samples and data (above). Recent regulation changes as a result of such studies are expected to improve the number of trophy-sized bass like this one (left). Flathead catfish have also been successfully stocked in many rivers to provide a trophy fishery (right).

Trout

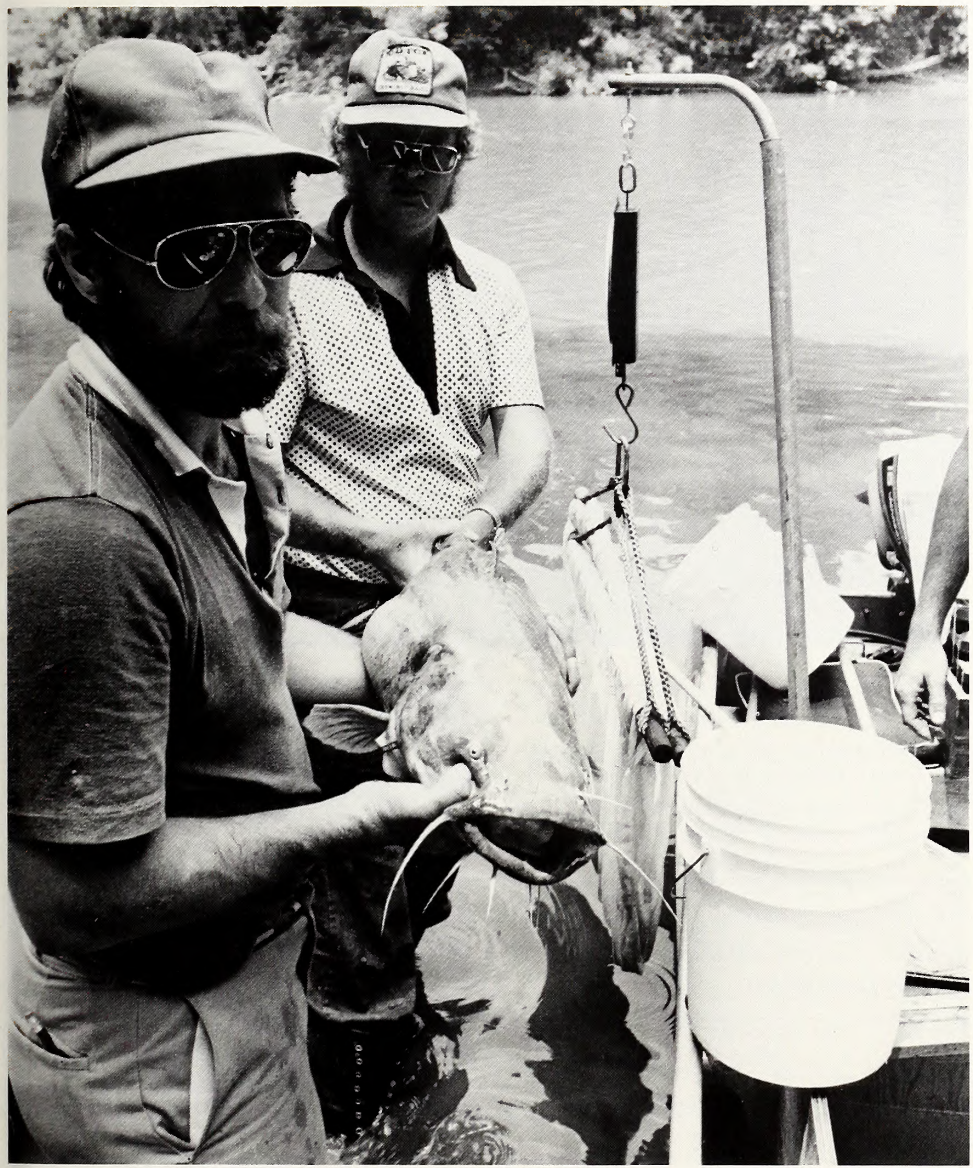
Over 4,000 miles of trout stream are found in western North Carolina, and about 1,800 miles of these streams are designated as "public mountain trout waters." Brook trout are found in cold headwater streams at high elevations. Rainbow and brown trout share some of these waters, and are also found in many waters at lower elevations within the Mountains.

The trout program is divided into two parts. Hatchery trout are provided in "General" waters where tackle and bait are unrestricted and anglers may keep up to seven fish per day. In "Native" and "Trophy" waters, populations of wild trout are protected by stringent regulations on creel limits, length limits and tackle.

Four Wildlife Commission fish hatcheries in the Mountains provide about half of the 680,000 brook, rainbow and brown trout that are stocked annually in North Carolina waters. These facilities include the Waynesville fish hatchery, Marion fish hatchery, Table Rock fish hatchery north of Morganton, and the Armstrong fish hatchery near Mt. Mitchell. The remaining trout are raised at federal fish hatcheries operated by the U.S. Fish and Wildlife Service. Most hatchery trout are stocked in general waters, although supplemental stockings of fingerlings are made on native and trophy waters as needed.

One important study completed during the biennium was a proposed plan to re-classify North Carolina trout waters using their biological characteristics as a basis. This exhaustive study determined water temperatures, status of trout and other fish populations, and food organisms present. Future recommendations for changes in trout stream classifications and regulations will be based on this information.

Habitat protection plays a key role in trout management. Industrial pollution and siltation from mining, road construction, farming and logging have destroyed some trout populations throughout the country. Many of these



Ken Taylor

activities continue to threaten trout, although strict water-quality laws passed in the past decade protect many streams. Fishery biologists are now often consulted when projects are planned that may threaten trout. Often, these projects can be modified to protect trout populations. For example, the Division of Inland Fisheries recently completed a set of guidelines for relocating trout streams when road construction is necessary.

A trophy fishery for steelhead trout in Mountain reservoirs is included in the trout program. Steelhead trout are sea-run rainbows native to the Pacific Northwest, and had been successfully introduced to the Great Lakes in the 1960s. Biologists felt they would do well in our large Mountain power reservoirs, where a natural predator was needed. In 1973, steelhead eggs were obtained from Michigan and stocked in tributaries of lakes James and Nantahala. Subsequent annual stockings were made in these waters, and in 1977 a spawning run was noted in the Nantahala River. Today, the Wildlife Commission raises about 50,000 young steelhead annually at the Waynesville fish hatchery. These young fish are stocked in lakes James, Nantahala and Fontana. Fishing for steelhead is popular on these lakes, and the fish are also pursued by anglers on winter spawning runs in the Nantahala River.

Muskellunge

Restoration of native fisheries is underway in the mountains. The muskellunge — the largest member of the pike family — is native to a handful of North Carolina mountain rivers that feed the Ohio River basin. Poor water quality had all but eliminated muskies in North Carolina by the early 1950s. In the 1970s, improvements in water quality (brought about by the passage of the Clean Water Act) prompted biologists to consider restoring this fine sport fish.

Today, muskies have been restored to the French Broad, Nolichucky, Cane and New rivers. At the Table Rock and Marion fish hatcheries, about 3,000 muskies are raised annually for stocking in suitable waters. Growth and catch rates for muskies in Tar Heel waters are being studied.

Tiger muskies — hybrids of muskies and northern pike that are well adapted to lakes — have been stocked in Kerr Scott Reservoir and lakes Rhodhiss, Hiwassee and Fontana. About 8,000 "tiger" fingerlings are raised annually at the Table Rock and Marion hatcheries. At 10 to 15 pounds tiger muskies aren't as large as muskies, but are much easier to catch.

Smallmouth Bass

Cool mountain rivers are home to the smallmouth bass, and work is being done to expand this popular fishery. Biologists recently completed a study of smallmouth bass waters in Wildlife District 7, which includes Watauga, Ashe, Alleghany, Wilkes, Alexander, Surry, Yadkin, Davie, Stokes and Forsyth counties.

Thirty-three streams were included in this survey. In these waters, the status, growth rates, and food base for smallmouth bass populations were determined. Biologists found that 19 of these streams offered good smallmouth bass habitat. Flooding, extreme temperature changes

Division Of Inland Fisheries

(often the result of removing stream-side vegetation which provides shade), and turbidity of water were found to be the limiting factors for maintaining smallmouth bass reproduction.

As a result of this study, four streams were stocked with smallmouth bass to reestablish populations. These waters offered good habitat for smallmouth bass, but populations were low or non-existent because of water-quality problems in the past. Over 60,000 smallmouth bass raised at the Marion and Table Rock fish hatcheries have been stocked over the past two years in the Little, Dan, Fisher, and Watauga rivers.

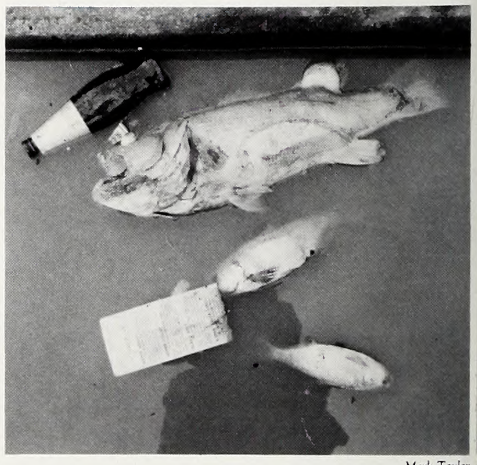
Coastal Striped Bass

One of the Division of Inland Fisheries' major efforts over the past biennium has been to determine the cause of reproductive problems in the Roanoke River-Albemarle Sound striped bass population. Egg viability rates — or the numbers of eggs that are alive and capable of developing after fertilization — have dropped alarmingly in the past decade.

Historically, the viability rate of striper eggs in the Roanoke River was 85 to 90 percent. In recent years, that rate has dropped as low as 38 percent. Biologists now take annual samples of eggs on the spawning grounds in the Roanoke River and at points downstream to monitor viability rates. Water quality in the Roanoke River is also being studied to determine if pollution is causing the egg-viability problem.

Increased sport and commercial fishing pressure on striped bass in Albemarle Sound and its tributaries was also examined. In 1980, an extensive creel survey of sport fish in these waters was completed. The survey showed that striped bass were the second most popular fish in Albemarle Sound, surpassed only by largemouth bass. Total sport-fishing pressure on these waters exceeded 400,000 fishing-party hours annually. Also, the catch rate for stripers in Albemarle Sound dropped from 32.9 angler-hours for each 12-inch fish caught in 1977 to 170 angler-hours per 12-inch fish in 1979. Growth studies showed that striped bass reached 12 inches — the legal harvestable size in joint and coastal waters — in two years.

Jim Dean / February, 1981 issue



Mark Taylor

Fish kills throughout the State are monitored by fisheries personnel to determine the extent of the kill and the costs of replacing the dead fish (right). Division employees spend many long hours sampling populations to determine the need for stocking. Where possible, however, natural reproduction of fish is preferred, though stocking is often necessary where significant fish kills occur. One fine sportfish frequently neglected by anglers is the chain pickerel (above).

Coastal Plain Fisheries

Efforts are underway to improve fishing in the Coastal Plain. One popular program is the development of a trophy fishery for flathead catfish in the Cape Fear River. A trophy fishery was lacking in this area until flathead cats were stocked several years ago. Anglers now catch catfish weighing over 50 pounds in the Cape Fear River. These fish are also excellent eating, and fight hard. Growth rates and populations of flathead catfish are being monitored.

In 1981, over 60,000 spotted bass were stocked in portions of the Cape Fear River and several tributary streams in Harnett County in an attempt to establish populations of this sport fish. The tributary streams which include upper and lower Little River, Parkers Creek and Avent Creek are swift and cool, and largemouth bass are largely absent from these waters. The spotted bass is similar to the largemouth bass, but prefers cooler, faster water. This program is still being evaluated.

Division personnel have also completed creek surveys on the lower Neuse River, Waccamaw River, and Lake Phelps. This information will be used to manage largemouth bass and other fisheries.

Division of Inland Fisheries Stocking Program

Warmwater Fishes Stocked

Species	1981	1982	Total
Bluegill	—	755,000	755,000
Bluegill hybrids	7,500	7,500	15,000
Channel catfish	12,400	190,100	202,500
Largemouth bass	7,500	1,344,700	1,352,200
Redear sunfish	50,000	525,000	575,000
Spotted bass	60,500	—	60,500
Striped bass	443,000	444,500	887,500
Striped bass hybrid	71,000	81,000	152,000
White bass hybrid	44,000	28,000	72,000

Coolwater Fishes Stocked

Species	1981	1982	Total
Muskie	5,500	2,600	8,100
Rock bass	30,500	24,500	55,000
Smallmouth bass	56,300	21,000	77,300
Tiger muskie	8,200	8,300	16,500
Walleye	4 million fry	5.4 million fry	9.4 million fry

Trout Stocked — 1981

	Brook	Rainbow	Brown	Total
State hatcheries	64,250	151,400	125,000	340,650
Federal hatcheries	29,000	226,000	85,000	340,000
Totals	**93,250**	**377,400**	**210,000**	**680,650**

Trout Stocked — 1982

	Brook	Rainbow	Brown	Total
State hatcheries	53,050	151,400	136,900	341,350
Federal hatcheries	29,000	222,200	85,000	336,200
Totals	**82,050**	**373,600**	**221,900**	**677,550**

Fish Kills

When a fish kill is reported, the Wildlife Commission is responsible for determining the damages to fish populations. The North Carolina Division of Environmental Management is responsible for determining the cause of fish kills, and taking legal actions if appropriate.

Fish kills are grouped into two categories — "formal" and "informal" kills. Formal fish kills involve more than 100 dead fish, and a detailed assessment of damages to fish populations is made. Informal kills involve less than 100 dead fish. These kills are closely watched, but investigations of damages and causes are not conducted.

In fiscal year 1981, the Wildlife Commission investigated 66 informal fish kills and 126 formal fish kills. Fish-replacement costs for the formal fish kills were $71,324.00. In investigating all fish kills, 2,295 man-hours were spent and the cost of these investigations was $33,026.00. In fiscal year 1982, the Wildlife Commission investigated 50 informal fish kills and 31 formal fish kills. Over 526 man-hours were spent investigating these kills, and costs of the investigations totaled $6,098.00. Fish replacement costs were $7,018.00.

Curtis Wooten

Technical Services

When projects are planned which affect freshwater fisheries, impacts on fish populations must be considered. During the biennium, the Division of Inland Fisheries was involved in environmental assessments of 576 projects. Biologists often work with other agencies to mitigate the effects of projects on fisheries.

Advice to landowners also comes under the heading of technical services. Some of North Carolina's best fishing is found in farm ponds, and the Wildlife Commission furnishes information on managing these ponds free of charge. During the past biennium, biologists offered technical assistance to 1,018 pond owners throughout the State.

Division Of Conservation Education

How can the citizens of North Carolina make sound decisions about matters involving wildlife and the environment if their knowledge and understanding of these subjects is incomplete? That question lies at the root of many of the changes that have taken place within the Division of Conservation Education during the recently completed biennium. Special emphasis on education is one reason the division's name was changed from the Division of Information and Education during this period. This name change was also part of the Wildlife Commission's reorganization.

During the two-year period covered by this biennial report, efforts have been made to incorporate more educational material in the division's publications and provide increased educational assistance to public schools through *The Carolina Notebook*, a new cooperative project begun to furnish instructional material to teachers on wildlife and environmental subjects.

Two highly successful projects were promoted through the combined efforts of division personnel: the Wildlife Endowment Fund and its provision for tax-free contributions and sale of lifetime licenses and magazine subscriptions, and the Wildlife Watch, a program designed to provide greater citizen involvement in the reporting of wildlife violations.

Efforts to meet these growing needs without sacrificing other programs and services have been hampered by increased costs and inflation. For example, the production of instructional material for teachers is partly the result of efforts to find cost-efficient ways to work with students. Routine travel costs have grown to the extent that on-site educational projects with schools have not been able to meet the needs. Other costs — printing, paper and materials — have also risen sharply during the biennium, and this has forced the division to trim all but the most essential publications and concentrate resources in those areas which reach the widest audiences.

Still, despite these problems, the division has accomplished much towards reaching more of North Carolina's citizens with useful information. Part of this has been achieved through the overall reorganization of the N. C. Wildlife Resources Commission. With precise goals based upon achieving the greatest possible efficiency, the division has managed to increase its output through its three sections: the Publication Section, Field Operations Section, and Audio-Visual Section.

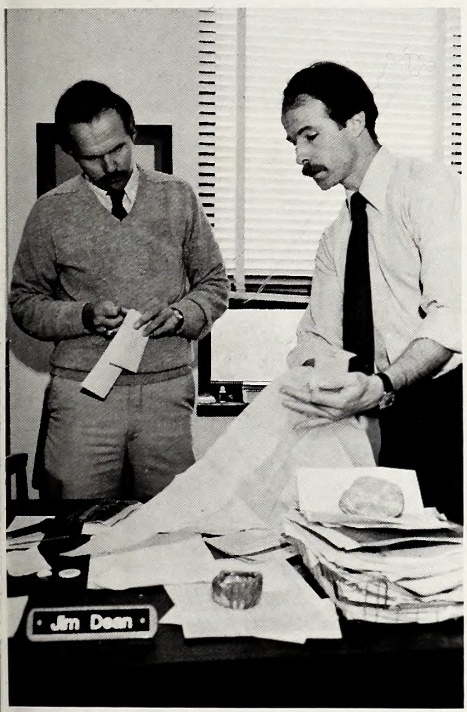
Karl Maslowski / January, 1980 issue

Publication Section

The Wildlife Commission's monthly magazine, *Wildlife In North Carolina*, continues to be the most widely recognized of the division's publications. As part of a continuing goal to upgrade this publication and increase the amount of educational material it carries, 8 pages were added to each issue during the biennium. Also, twice during the biennium, the format was upgraded significantly, and readers have responded favorably to these changes.

Other evidence of these improvements in quality are reflected in the awards won by the magazine during the biennium.

Ken Taylor



Ken Taylor

Editors and artists work together on many publications put out by the Division of Conservation Education. Wildlife In North Carolina *editor Jim Dean and associate editor Larry Earley (left) confer on a rough sketch for an upcoming magazine article, while art director David Williams meets with artists Peggy Callaway and Nancy Davis (above).*

Wildlife In North Carolina has taken three prestigious honors in international competition among wildlife and natural resource agency magazines as part of the Association for Conservation Information (ACI) award's program. Second places in outstanding magazine writing and editing and color magazine layout were presented by ACI in 1981, while the magazine took third place in color photography during 1982. The magazine also won the N.C. Wildlife Federation Governor's Award as "Conservation Communicator of the Year" in 1982.

During the biennium, magazine circulation continued to climb slowly to over 52,000 despite a recession, and despite the availability of promotional funds. One part of this division's reorganization was the realignment of duties for a promotion director to oversee not only magazine promotion, fulfillment and circulation, but also help devise and handle such highly successful promotional projects as the implementation of the Wildlife Endowment Fund and its donations and lifetime series of licenses, and the statewide Wildlife Watch program. Also as part of this effort, the division branched out into the sale of various promotional items including T-shirts and magazine binders. The Publication Section provided essential assistance — along with the Division — to the Wildlife Commission's Chairman's Advisory Board in the preparation of a wildlife calendar. A more active role was undertaken in the preparation and manning of wildlife exhibits and sale of magazines and other items across the State, including the first Outdoor Expo in Raleigh. Section personnel assisted in the preparation of several significant displays for exhibition at these functions, as well as a large acid rain display for permanent display at the Waynesville Fish Hatchery.

The Publication Section continued production of spot news releases and a large bi-monthly newsletter. The newsletter received a third-place award from ACI in 1982 as one of the top newsletters produced in the nation, the second such award in recent years. Section personnel were also involved in the planning and preparation of two new publications: the teacher's guide to wildlife and environmental subjects called *The Carolina Notebook,* and *Hunter Safety Notes. Carolina Notebook* has proven especially successful, and its use by teachers in public schools is growing rapidly.

The Publication Section also prepares and maintains a variety of publications for free distribution to the public; however, budgetary limitations during the biennium prevented the preparation of new brochures. Also, stocks of many of the older brochures were allowed to run out following a review to determine their need. Only those judged necessary were reprinted.

Ruby Harbison / May, 1982 issue

Division Of Conservation Education

Field Operations Section

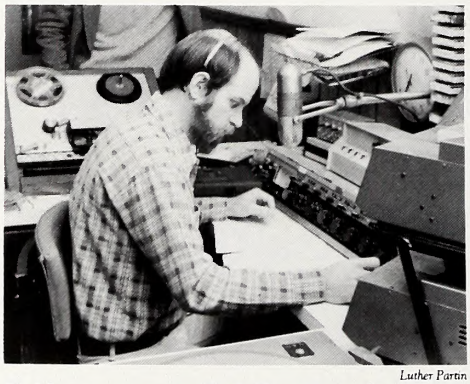
One portion of the reorganization centered on the transfer of four former boating safety education representatives into the division about half-way through the biennium. One of these representatives was named assistant chief, while the others became part of the Field Operations Section. At the end of the biennium, the Section consisted of five field representatives and one supervisor.

Much of the editorial work and planning of *The Carolina Notebook* is centered in the Field Section which cooperates closely with Publications personnel in design and printing. During the reporting period, five issues of 500 each were prepared, and interest and use has grown sharply.

Field Section personnel are heavily involved in radio and television work because these outlets reach a broad cross-section of society. In both areas, production increased this biennium over the previous one. Three field representatives produced 110 (up from 81) weekly radio programs, not including local programs or live appearances on talk shows or phone interviews. Television program production also increased to a total of 210 programs (up from 200), and these did not include programs arranged for other Wildlife Commission personnel, or news coverage which did not include personal appearances of Field Section personnel. Local radio stations continued to be helpful in providing assistance and the use of their broadcast studios to record master tapes which are copied and sent to cooperating stations. Program content for radio and television shows covered a wide variety of topics, but centered on Wildlife Commission activities, seasons and regulations. Many interviews with Commission personnel, such as biologists, were arranged.

While emphasis continues to increase on getting the message out via radio and television, print media assistance and coverage also increased. Section personnel provided 96 news releases and coordinated the writing of 132 other releases for a total of 228 (up from 183 in the previous biennium). In addition, personnel provided 36 public programs, 30 school programs and manned and set up 27 displays during the reporting period.

Tim Hergenrader



Luther Partin

Field representative Rick Estes records a program of wildlife information that will later be broadcast over many Piedmont radio stations. Field representatives also work with school children and coordinate media coverage of Commission events (above).

As part of their regular duties, Section personnel also continued to contribute to goals to improve both the content and circulation of the division's magazine, *Wildlife In North Carolina.* As part of the long-range planning of magazine issues, Field Section personnel prepared 24 articles during the biennium (or an average of one major feature per issue during the two years), and photographed and submitted for consideration hundreds of color slides and black and white photographs, many of which were published. Also, section personnel sold 594 magazine subscriptions.

In addition to these duties, Field Section personnel met with other agency personnel over 400 times, answered letters, coordinated meetings, helped produce slide shows and assisted in the sale of T-shirts, lifetime licenses and subscriptions, calendars and other items.

Audio-Visual Section

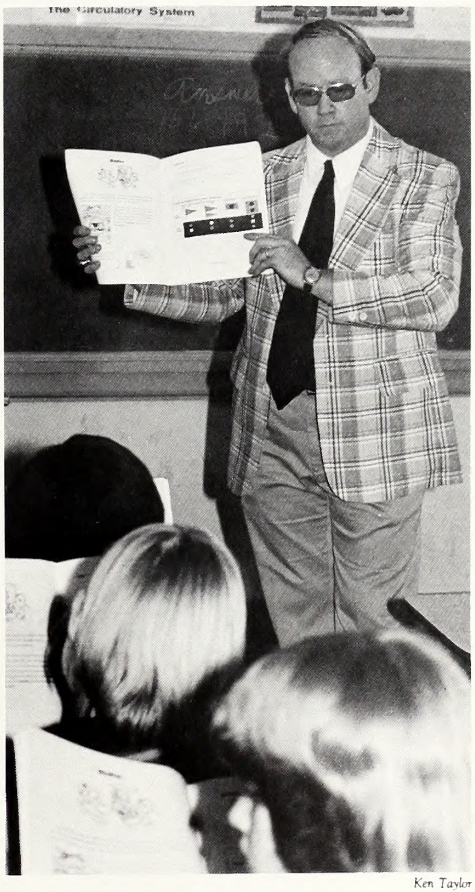
During the biennium, emphasis on production of feature length movies on wildlife and environmental subjects was shifted to the production of slide shows and color and black and white photography. Although the 26½ minute film, "Wildlife Horizons," which was produced in the previous biennium has proven popular with audiences during this reporting period, such films are quite expensive and a shortage of funds led the section towards other means of reaching the public. Therefore, during the biennium, five slide shows were produced for use by Commission personnel.

As part of the production of these slide shows, the Audio-Visual Section produced an average of 10,000 slides per year for the

Jane Rohling

Curtis Wooten

Exhibits are good ways of communicating information about wildlife conservation. During the biennium, section personnel prepared an exhibit on acid rain for the 1982 State Fair (left), and Jane Rohling designed and built the new Waynesville Hatchery exhibit. Mike Overton (below) talks to a junior high school audience about boating safety.



Ken Taylor

two-year reporting period. These slides were edited not only for use in slide shows, but many were also assigned and photographed for other division uses, especially in *Wildlife In North Carolina* magazine. Also, black and white photographs were shot for use in the magazine and also for use in the newsletter and other publications.

Section personnel also began to reorganize and catalog the division's extensive slide and black and white files during the biennium, and set up a new system of photography retrieval.

Also, the division's film library was upgraded and 10 new film titles were added. Older, worn out, films were replaced. The film library continued to be a popular program during the biennium.

Despite a shortage and turnover of personnel within the section, assistance was provided to other division and Commission projects on a variety of levels. Late in the biennium, personnel began the planning and construction of a major permanent display on trout for the Waynesville Fish Hatchery, and assistance was also provided on other displays especially where photography was involved. Also, as part of the section's assistance to the Publication Section, special photographs were planned and taken to be used as part of the promotion of the Wildlife Endowment Fund, and as special promotion or layout for *Wildlife In North Carolina* magazine. Section personnel also assisted in the preparation of the first N. C. Environmental Quality Index, an excerpt of which was published in the magazine.

Division Of Administrative Services

Wildlife conservation is changing. The increasing complexity of the field work necessary to protect and enhance our wildlife resources requires more administrative support than ever before. For every license sold, animal stocked, boat registered or violator apprehended — in fact, for every dollar spent — reports must be completed and records maintained.

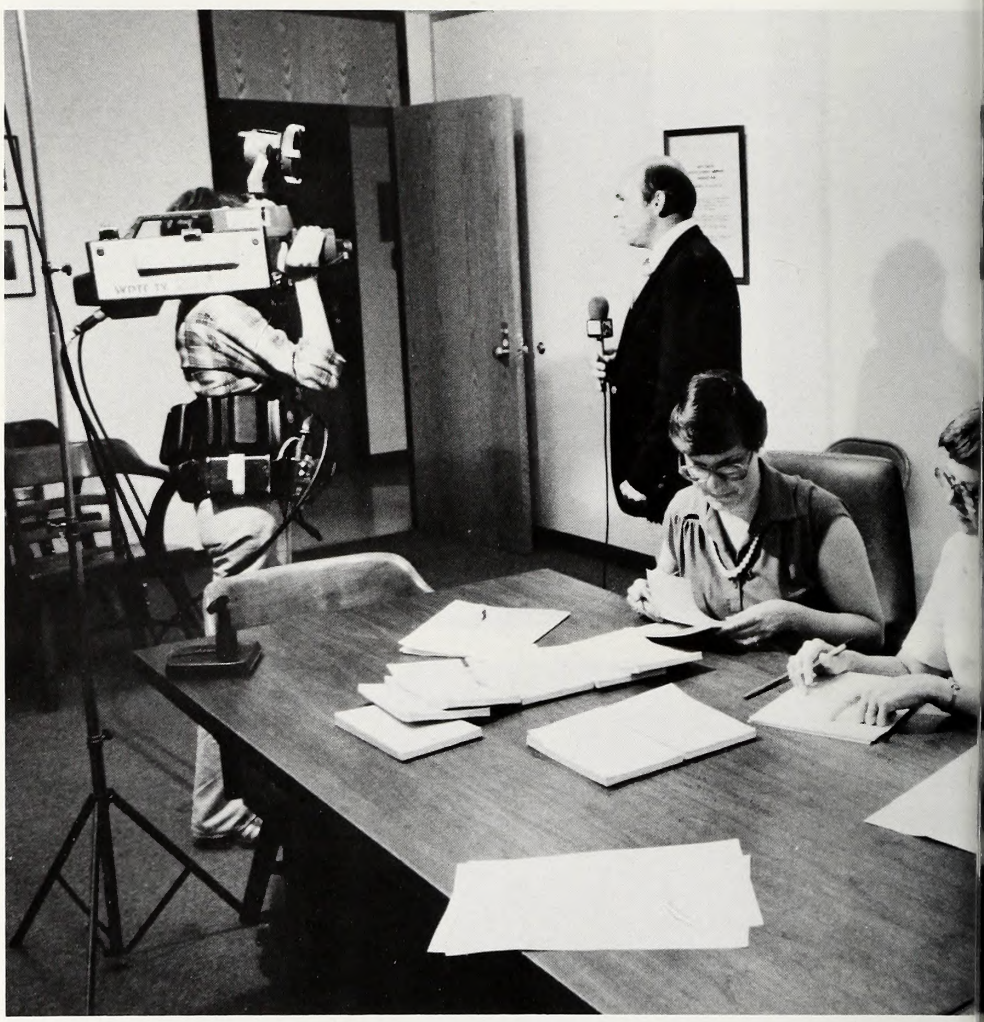
The Division of Administrative Services is the arm of the Wildlife Resources Commission that provides this essential support. Like all divisions within the Commission it must handle increasing demands at a time of fiscal austerity. The Commission's operating costs are rising at a time when recreational demands on the resource are expanding, the State population is growing and more pressure is being placed on wildlife habitat. Because of these demands, Administrative Services has been called upon to become even more sophisticated and efficient in its operations and procedures.

During the 1980-82 biennium one important result of the need for efficiency was the reorganization of Administrative Services and its elevation to divisional status. Before the reorganization Administrative Services consisted of licensing and finance functions. The division now includes sections that provide such support services as data processing, finance, purchasing, stock maintenance, licensing and motorboat registration. The goal of the reorganization is to enable the agency to provide the most efficient internal support to critical field operations more quickly and for the least amount of money.

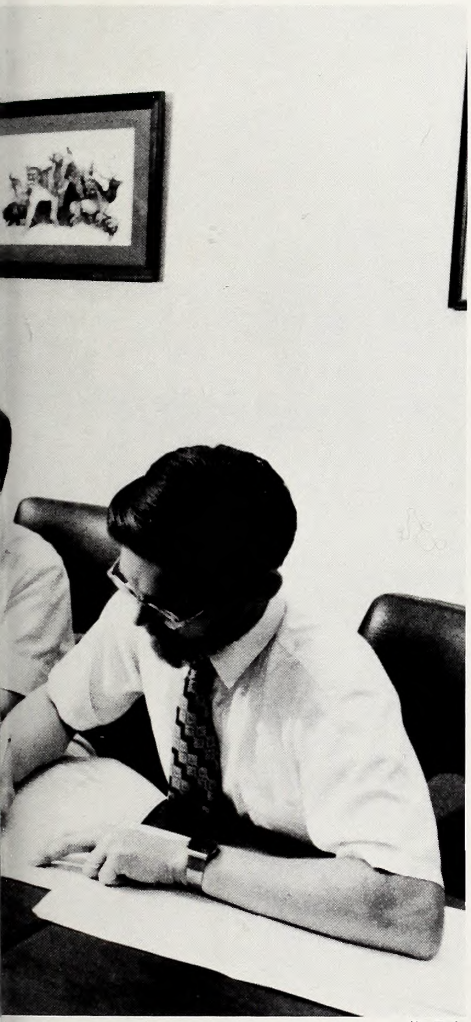
The 32 people in the Division of Administrative Services perform a wide variety of essential services for the agency, the resource, and the conservation public. During the biennium, these services included:

— maintaining accounts for over 1,100 license agents statewide who sold 1,779,527 hunting and fishing licenses producing $15,968,369 in revenues;

— processing nearly 50,000 boat registrations through 230 local motorboat registration agents; 129,600 registrations and 29,903 duplicates and transfers in the Raleigh office; and maintaining



Ken Taylor



Ken Taylor

Ken Taylor / April, 1982 issue

Ken Taylor

Marion Matthews and Wilma Parker (left) sell hunting and fishing licenses to sportsmen. Administrative Services personnel also handle motorboat registrations (right) and are currently maintaining records for such new programs as the Wildlife Endowment Fund. In 1981, television crews monitored the selection of lifetime license No. 1, administered by Connie Spivey (center), Section Chief, and Dick Hamilton, then Assistant Director of the Wildlife Commission.

Division Of Administrative Services

Jane Rohling / April, 1982 issue

registration information on approximately 190,000 registered boats;

— developing a computer program to issue a limited number of special permits for harvesting either-sex deer on selected game lands. This program included random selection and notification of participants as well as printouts to assist wildlife management and enforcement personnel in monitoring the hunts and analyzing their results;

— creating a master file of North Carolina hunting and fishing license holders;

— updating the list of current subscribers to *Wildlife in North Carolina* magazine;

— overseeing receipts to the Wildlife Endowment Fund. By the end of the biennium, this fund, created by legislation effective May 29, 1981, had received over $800,000 from the sale of lifetime licenses, lifetime magazine subscriptions and contributions;

— consolidating the Motorboat and Wildlife funds for accounting purposes.

In addition, the division wrote over 28,000 checks, processed 5,500 requisitions for stock, handled 1,400,000 pieces of mail, and received and disbursed over $3,800,000 in federal funds. All this was accomplished with improved efficiency, even though the division had fewer employees than during the previous biennium.

Computers are essential to most modern businesses, and the Wildlife Resources Commission is no exception. Data processing personnel keep records on a multitude of subjects, from hunting and fishing licenses, accounting operations, motorboat registrations, subscriptions to Wildlife In North Carolina, *and records of federal aid received. The Data Processing Section also works with biologists to keep records of deer kills, big game studies and other research.*

Numbers alone do not tell the full story, however. It is the dedication of the division's 32 employees that gives meaning to the results.

The divisions's accounting technicians, key punch operators, stock clerks, computer programmers, and typists could do the same kinds of work in many private businesses, but their duties with the Wildlife Resources Commission require some special skills and talents. Because of the nature of their work, many of the division's employees communicate with license and motorboat registration agents and the public by telephone and through written correspondence. This requires a thorough knowledge of the Commission's programs and the ability to help clients who have questions or problems to be resolved.

Their work increases during certain seasons of the year as wildlife-related recreational activities change. For example, during the last few days of August and early September, dove hunters rush to buy their licenses before the season opens. Later, during October, a larger rush occurs before the opening of many hunting

Ken Taylor

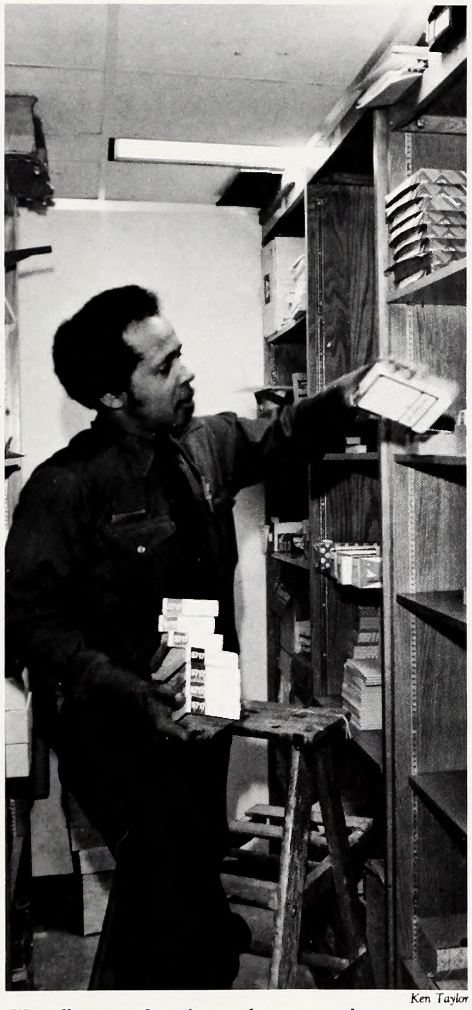
seasons. Before these flurries of activity, license-section personnel must have license agents across the State ready with ample supplies of licenses, permits, and other necessary paperwork and information. Then, license and data-processing personnel receive monthly sales reports from the agents. They must account for each license sold and make the information available to the legislature, sportsmen, and the general public.

Again in early spring, when warming weather starts fishermen thinking of that favorite river or lake, the license section experiences a peak in activity. A planned change in the expiration dates of hunting and fishing licenses that will make all annual licenses valid for the same period may reduce the number of these seasonal rushes, and will be more convenient to the sportsmen. Currently, fishing licenses are valid through the calendar year, while hunting licenses and combination hunting and fishing licenses are valid from August through July. Beginning July 1, 1983, both will run from July 1 through June 30.

For the boating registration section, the spring and summer seasons are the busiest. A recent change in the boating-registration renewal system now enables boat owners to have their registrations renewed locally by a motorboat registration agent. This is more convenient to the boat owner, because formerly all renewals were handled in the Raleigh office.

January, February, and March are particularly hectic for personnel in the data-processing section. During these months, special hunting permits, fur-harvest reports, and big-game tag reports must be processed.

Division Of Administrative Services



Ken Taylor

Handling mail and warehouse stock are important support services that keep both field and office operations functioning. Melvin Jones (above) is one of a team of workers that handled almost a million and a half pieces of mail during the biennium.

Revenues — July 1, 1980 – June 30, 1982

	1980-1981	1981-82
Hunting & Fishing Licenses	$ 8,023,843.24	$ 8,020,286.85
Bonding — Agents	5,599.00	8,059.00
Management Area Receipts	282,264.41	258,787.44
Federal Cooperation	2,626,466.27	1,215,706.42
Fish Kill Reimbursement	36,377.44	75,049.43
Gasoline Fuel Tax	285,860.31	323,552.24
Motorboat Registrations	742,758.00	1,015,827.50
Sale of Publications	196,067.71	234,724.97
Sale of Surplus Property	79,972.90	119,304.34
Rental of State Property	9,250.20	8,294.45
Donations	2,334.50	3,185.00
Transfer from NRCD	700,299.00	1,191,784.64
Transfer from Prior Year Deferred Obligations	6,793.00	.00
Interagency Transfers	55,022.94	38,485.70
Imprest Cash Fund	300.00	300.00
Personalization Fees	.00	4,370.00
Miscellaneous Receipts	77,549.29	68,532.93
Refund of Receipts & Expenditures	487,685.45	509,483.07
Total Revenues	**$13,618,443.66**	**$13,095,733.98**

As each section continually modifies procedures to meet the daily workload as well as these periods of "extra" work, new and better ways are found to serve the agency and the public.

The positive results of these streamlined procedures can be seen in the expanding role of the Division of Administrative Services. One example is the fiscal administration of the Wildlife Endowment Fund. This new program was enacted by the General Assembly during the 1980-82 biennium. The division is handling all accounting for this fund (which grew to nearly $1 million during its first year). It is also issuing lifetime licenses and magazine subscriptions, and maintaining the financial records on lifetime licenses, magazine subscriptions and contributions to the fund — all without additional personnel.

Division personnel are handling additional programs and activities while still providing increased amounts of information on traditional programs to employees, members of the media, the legislature, sportsmen and the general public for management and planning decisions.

It is this kind of flexibility in meeting the changing needs and opportunities in the field of wildlife conservation that makes the Division of Administrative Services a vital part of the Wildlife Resources Commission's programs today and for the future.

Summary of Operations

	1980-81	1981-82
Cash Balance Carried Forward From Preceding Year	$ 3,182,331.31	$ 3,433,976.68
Gross Receipts for Year	13,618,443.66	13,095,733.98
Total Available Funds	16,800,774.97	16,529,710.66
Less Expenditures	13,366,798.29	13,455,953.66
Cash Balance June 30, 1981	3,433,976.68	
Cash Balance June 30, 1982		$ 3,073,757.00

Expenditures — July 1, 1980 – June 30, 1982

	1980-81	1981-82
Administration		
Administration Policy & Regulations	$ 495,245.62	$ 481,369.19
Habitat Conservation	480,599.29	111,201.41
Construction & Maintenance	387,288.82	482,339.66
Administrative Services		
Finance & Purchasing	262,433.57	245,709.84
License & Motorboat Registration	416,380.51	439,196.01
Data Processing	224,554.51	220,814.80
Enforcement	5,101,030.06	5,266,677.86
Hunter/Boater Safety	298,913.24	280,630.35
Conservation Education	746,180.82	996,939.19
Inland Fisheries		
Administration	67,339.06	71,085.04
Production	669,444.20	580,222.29
Research	731,725.83	807,693.06
Wildlife Management	2,683,174.63	2,687,605.96
Reserves	307,149.68	222,385.93
Transfers	7,653.00	52,600.00
Refund of Receipts & Expenditures	487,685.45	509,483.07
Total Expenditures	**$13,366,798.29**	**$13,455,953.66**

Other Services

The primary responsibility of the Habitat Conservation Section is to prevent, reduce or mitigate the loss of prime wildlife habitat, and to prevent the degradation of this habitat by advocating better use and stewardship of our lands and waters. It works closely with agencies and organizations that either sponsor habitat-threatening development or are responsible for receiving or issuing permits for certain types of development. It is important work in a rapidly growing State like North Carolina.

Crop fields in eastern North Carolina now extend so far that the distant trees appear to be a hedgerow. What were fast-flowing trout streams have been reduced to a trickle because of withdrawals for municipal growth or to supply newly built vacation homes. Floodplains along rivers have been channeled and diked and are now the sites of residences or industries. New highway corridors, utility rights-of-way, giant reservoirs, and eastern mega-farms are signs of the time. This expansion of man's needs and wants is exerting tremendous demands on soil, air, water and forests.

Currently there are strong and effective federal, state and local laws and regulations that give the Habitat Conservation section the authority to review projects and make recommendations. In addition, the state and federal Environmental Policy acts require pre-project Environmental Impact statements for major development projects funded with public monies that require a permit and are expected to have a significant impact on the environment. By reviewing these statements, the section has an opportunity to recommend improved project designs or measures benefiting fish and wildlife resources.

During the 1980-1982 biennium, the Habitat Conservation section prepared a document entitled "Guidelines for Conservation of Wetlands and Aquatic Habitats" to help the Commission's field biologists who inspect and evaluate the impacts of proposed development projects. This position statement was approved by a special resolution of the Wildlife Resources Commission, and then provided to all field biologists. The guidelines focus on the major development activities that commonly have adverse impacts on wetlands habitats. They also set forth standards for assessing the degree of impact, and present criteria for recommending ways to prevent habitat degradation.

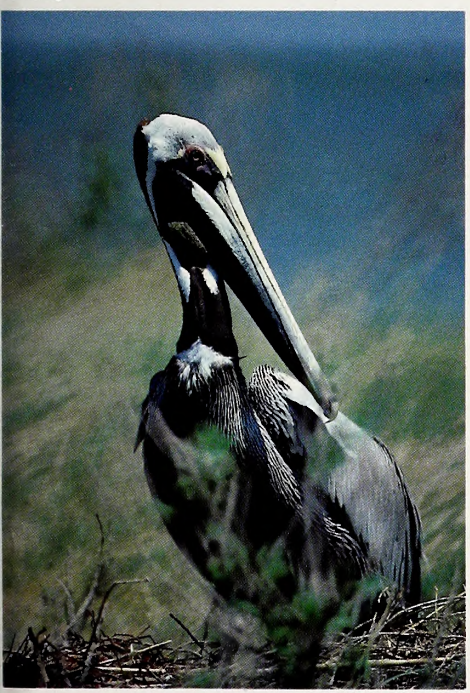
The section has continued close coordination with the Corps of Engineers to assure that adequate provisions for fish and wildlife conservation were involved in the plans for the construction and development of the Falls of the Neuse and B. Everett Jordan reservoir projects. Through cooperative agreements, the Commission currently administers the public hunting and fishing activities on these projects.

After negotiations over the improvement of a project design, the City of Durham agreed to dedicate 400 acres for wildlife management and to provide public fishing and hunting opportunities on the proposed Little River Reservoir in Durham County. Similarly, agreement was reached with Carolina Power and Light Company to enter about 4,000 acres of the Shearon-Harris Nuclear Facility into the Commission's Game Lands Program, to allow hunting and fishing on the new reservoir and to construct two boating-access ramps. At the Mayo Creek Stream Generating Facility in Person County 1,000 acres were entered into the Game Lands Program, in mitigation for wildlife habitat lost from construction of the cooling lake.

David Williams / October, 1982 issue

The Habitat Conservation Section works to prevent the loss of wetlands (above) and other irreplaceable wildlife habitat. Federal funding for endangered species research like the brown pelican study (right) was terminated, because federal funding ended, but important work with endangered species was accomplished, like the golden eagle hacking, or rearing, project in Haywood County, (top, right).

Jane Rohling



Ken Taylor

Projects Reviewed

	No.	Recommended for modification or Permit Denial
Airport Construction Expansion	1	0
Wastewater Treatment Plant Construction	72	37
Highway Construction	117	43
A-95 Clearinghouse Projects & EIS	243	23
401 Certifications	142	16
Dam Construction	105	3
Corps Permits for Construction in Wetlands	242	58
State Permits for Coastal Dredge & Fill	349	74
Renewals for State Permits for Coastal Dredge & Fill	140	27
Land Use Plans	18	4
Hydro-Power & Water Supply Projects	65	0
Total	**1,494**	**285**

The section's responsibility for the administration of the Commission's endangered species program continued. However, federal funding assistance was ended at the close of the biennium, when Congress failed to appropriate monies for the federal fiscal year beginning October 1981. Remaining funds were used to complete the analysis of data collected during the preceding years and active projects were scheduled for termination. These projects included research on the population, status and management of the American alligator, brown pelican, red-cockaded woodpecker, Neuse River waterdog, river otter, bobcat, loggerhead sea turtle, and the endemic fishery and molluscan fauna of Lake Waccamaw. Additional programs for the recovery of endangered species included the "hacking" or rearing and release of young golden eagles in western North Carolina, hacking of peregrine falcons on Mackey's Island in Currituck County and the annual winter census of the bald eagle population in the State. Funds were also provided to keep current information entered into Natural Resources and Community Development's computer data bank for endangered species.

Most recently the section sponsored a study to determine the status of the habitat that remains available for fish and wildlife resources. This information is essential to planning long-range management programs, to identify problem areas and to arrange the program elements in order of importance. The preliminary objective of the study is to determine the necessary procedures and economic feasibility of conducting a statewide inventory of major habitat types using computers to interpret satellite photography. Habitat types have already been defined and associated wildlife species have been listed. The study is expected to define and delineate major habitat types, as well as those types of special significance because of the wildlife they support or because of their scarce or fragile nature. It will also document habitat requirements for the major forms of wildlife and rare species; identify unoccupied habitat and habitat requiring special management; strengthen efforts to preserve essential habitats; determine trends in land uses; and provide a basis for greater public understanding and support of wildlife programs.

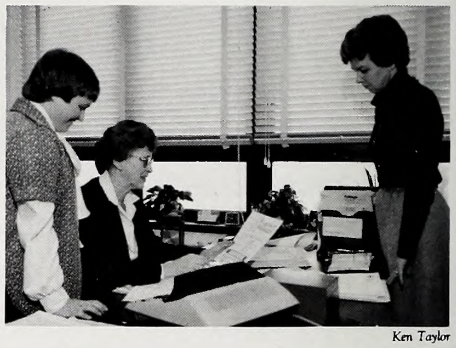
The section's field staff completed the

Other Services

Ken Taylor

Building boating access areas is still one of the Wildlife Commission's most popular services, and the Construction and Maintenance Section is responsible for this work. Under the reorganization plan Section technicians also maintain hatchery buildings and waterfowl impoundments.

Personnel staff perform an often under-appreciated service, preparing and processing forms for employment, and promotion, while also handling employees' benefits, maintaining personnel files and other essential support work. Section head Willa Deans confers with Kay Godwin and Marlene Creech.



Ken Taylor

contractual wildlife and habitat inventory on the Sandy Creek Watershed in Cumberland County, the site of a proposed watershed improvement project administered by the Soil Conservation Services (SCS). The crew continued their studies of the Burgaw Creek Mosquito Control Project, under contractual agreement with the Division of Health Services, and expanded the scope of their field investigation to include Grove Creek in Duplin County, Southwest Creek in Lenoir County, and a post-project check of Island Creek in Onslow County. They also attended planning meetings for any future mosquito-control projects for mosquitos which breed in salt marshes.

Construction and Maintenance Section

Formerly a part of the Division of Boating, the Construction and Maintenance Section was brought under the Director's Office during the biennium as part of the Commission reorganization. The section now is led by a supervisory wildlife engineer, with two regional staff members supervising 16 technicians.

The primary duties of the section have not changed. Staff personnel still maintain and develop boating access areas statewide, one of the most popular services provided by the Wildlife Commission. Section personnel constructed six new access areas during the biennium, bringing the total number of access areas to 138. They also repaired and maintained existing structures.

The reorganization plan gave the section additional duties, including the maintenance of Commission fish hatchery buildings, and the maintenance of waterfowl impoundments and dikes. Some of this work was formerly contracted out to private businesses at considerable expense to the Commission.

Funding cutbacks have affected some section programs during the biennium. The placement of waterway markers and the clearing of streams, both duties traditionally performed by section personnel, have been reduced. In addition, the construction of new boating access areas is now funded primarily by special local appropriations for specific areas. The work is still performed by construction personnel.

Personnel Section

The Personnel Section functions under the Director's office and consists of three employees. They are responsible for preparing personnel action forms for employment, promotions, performance increases, longevity, and premium pay. They also handle employees' benefits, maintain personnel files, communicate personnel policies, guidelines, and other information to employees, and prepare employee payrolls.

The Wildlife Resources Commission has 426 permanent positions and approximately 35 temporary positions in five divisions and the administrative units. During the biennium a new grievance procedure was adopted to provide for communication between supervisors and employees and to ensure prompt, orderly and fair responses to grievances and appeals. Revisions in the merit-increase policy for salaries were also implemented, and the Commission implemented a program for the purpose of reviewing the performances of employees. The agency's affirmative action plan was updated each year. It provides for equal employment opportunities to individuals in protected categories.

Currently, a revised employee manual is being completed to be used by employees for reference and guidance in conducting agency assignments and to inform and guide them in matters relating to their employment.

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION
TO: Division Chiefs
FROM: Vernon
HANDLE
REVIEW AND RETURN
YOUR RECOMMENDATION REQUESTED
INVESTIGATE AND PREPARE A REPORT
DRAFT A REPLY FOR MY SIGNATURE (REVIEW)
FOR YOUR INFORMATION AND FILES
FOR YOUR APPROVAL
REVIEW AND LET'S DISCUSS
9-10-82
REMARKS:
Reports for the upcoming biennial issue are due next week. Ken Taylor will be shooting photos today and tomorrow. We want to wrap up that issue ASAP. Let's make it the best ever!
Thanks
Vernon
NORTH CAROLINA
WILDLIFE IN NORTH CAROLINA
Welcome Back, Red
NORTH CAROLINA
HUNTING AND TRAPPING REGULATIONS DIGEST
1982
LAND FISHING
ULATIONS DIGEST
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WILDLIFE IN NORTH CAROLINA

FEBRUARY, 1983 75 CENTS

Ship Of Frogs

by Jim Dean

The old cigar box had not been opened since I was a child, yet when I saw it in the attic, I knew it still contained magic. Inside, I found some of the things that had been important to me more than 30 years ago. There was a beanshooter (you might call it a slingshot), a powerful magnifying glass, a dried turtle shell, a small rubberband-powered speargun, a deck of playing cards with fish species on the back, a tube of BBs, a broken pocketknife, fish hooks, a tiny, but functional bow and arrow, and a raccoon's foot.

There were also marbles, an old coin or two, a Crackerjacks' prize and a number of other items, but these were of lesser interest to me then — and now. The most prized possessions were those toys that had introduced me to the adventure and mystery of the natural world.

Like most kids, I was both protector and terrorist. I bought turtles at the dimestore, peeled the pink paint from their shells and nurtured them to health, yet I spent hours trying to develop that rubberband speargun into an effective weapon for the huge bullfrogs that lived in the ditch in front of the house.

illustration by David Williams

I used the magnifying glass to study countless bugs, marvel at the colored scales in a butterfly wing or watch ants milk aphids. But I confess I also sizzled a few ants by directing the sun's rays on them. An injured bird was a special project requiring popsicle stick splints and eye-dropper feedings, yet I would hunt sparrows with an air rifle until I ran out of BBs.

The typical kid is a mixture of stewardship and harvest, a blend that I suspect is entirely natural. I think of my friend, a noted entomologist, who confided that his lifelong fascination with insects began when he fed ants to ant lions in the sandy soil under a shed in his backyard. His special interest now is rare insects.

"I was absolutely charmed by the life around me, by the variety and the violence," he says now. "What was merely an interest has grown into a career, and feeding ants to ant lions may well have been the impetus for it. I can tell you this, I learned early that sentiment does not exist in the natural world I studied. But most of all, I developed a lasting curiosity about things, and it is just as intense today as it was when I was 12 years old. And I think I've given back more than I ever took."

I can't trace my own interest and career in the outdoors to any specific thing, but I was fortunate enough to have parents and grandparents who encouraged it. Some adults seem to know exactly how to focus youthful curiosity and introduce kids to the adventure and mystery around them. David Williams' grandfather certainly did.

"My brother, Skip, and I had been trying to catch some bullfrogs in this pond, and our grandfather came up with an incredible scheme," said David. "He told us to get a wide plank and tie a long string to one end of it. A candle was afixed upright in the middle of the plank.

"When it gets dark, he told us, you light the candle and slowly pull the plank along the edge of the pond. The candle will attract all sorts of moths and other insects, and the bullfrogs will leap up on the plank and sit there catching the insects. We thought it was a swell idea, and we set it all up just the way he told us.

"That evening, we lit the candle and skirted the edge of the pond with the string until we got back to the pier, then we waited until we figured enough insects had been attracted. We could hear those old bullfrogs jug-a-rumming around that pond, and we began to pull the plank along the edge. I'll never forget how excited we were. We were absolutely convinced that when that plank rounded the last bunch of cattails, it would be stacked up with bullfrogs.

"You know something? There wasn't a danged frog on that board, but I guess it was a good thing because we had never stopped to figure out how we were going to get all those frogs off the plank and into our sack. It was a heck of an idea, though."

Who knows whether that caper had anything to do with David's career (he's art director for this magazine), but it was surely a significant chapter in his introduction to the great outdoors. It wouldn't surprise me to learn that every naturalist, every outdoorsman, could tell similar tales. And somewhere among their childhood toys may be a box of memories filled with such things as turtle shells and beanshooters. It wouldn't surprise David to learn that in the attic back home is a plank, a candle and some string — a ship of frogs whose real cargo was a lifelong love of nature's mysteries.

North Carolina State Library
Raleigh

February, 1983
Volume 47, No. 2

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

CONTENTS

N. C.
Doc.

4 **Late Season Rabbits** *by Ed Jenkins*
After the deer seasons close, you may have better luck finding cottontails in whitetail territory.

9 **The Armchair Sportsman** *by Jim Dean*
A good book or short story can help you pass the waning months of winter, especially if its has an outdoor flavor.

12 **The Night Hunters** *by Jane Rohling*
Many people who are fascinated by owls have never even seen one in the wild, and misconceptions about them are common.

19 **The Lady Could Shoot** *by Mark Taylor*
Southern Pines was home to Annie Oakley for a brief period after she retired from Buffalo Bill's "Wild West Show."

24 **Sixty-Five Years On The Cape Fear**
by Crawford Marshall as told to Lawrence S. Earley and Ted Dossett.
Life on the lower Cape Fear River as remembered by this long-time outdoorsman. Another in a series of Carolina Profiles.

27 **Wildlife Endowment Fund Hits $1 Million**
by Mark Taylor
Goldsboro businessman is honored by Governor James B. Hunt Jr.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

Back Of The Book *written and edited by Mark Taylor*

Front Cover *A full moon rising in the night sky behind a great horned owl marks the onset of activity for this nocturnal hunter. Photograph by Steve Maslowski.*

Back Cover *The age-old communion between hunter and beagle is never more complete than when a cottontail becomes the catalyst. Photograph by Ken Taylor.*

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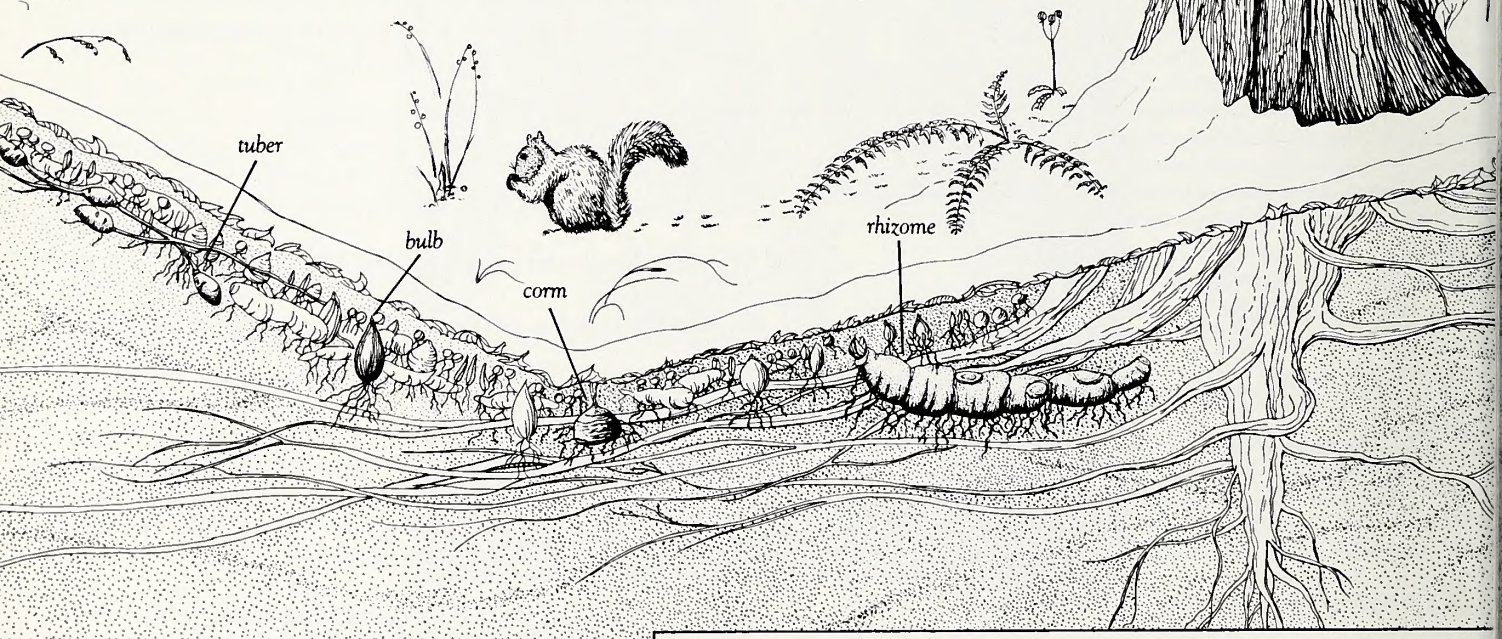
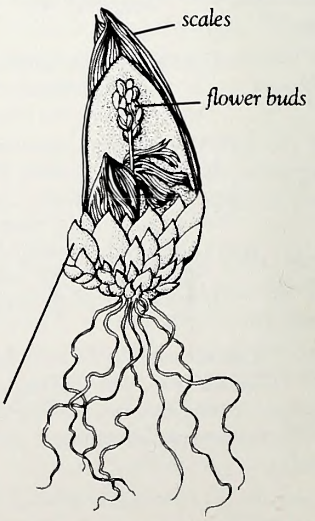
NATURE'S WAYS

The flowering dogwood tree has dropped its leaves, but its leaf and flower buds carry the promise of new life. The buds grew this large last summer and then stopped growing. Folded tightly within, the new leaves and flowers can pass the winter safely.



Last year's wildflowers have long disappeared, but underground food storage bins — tubers, rhizomes, corms and bulbs — preserve the buds of next year's flowers. Some flowers get a head start on spring. Last summer the underground bulb of the Dutchman's Breeches (right) developed tiny flower buds and leaves inside layers of protective scales. The approaching winter shut down the plant's growing activities, but in spring the early-blooming flower will quickly complete its development aboveground.



Winter's Hidden Promise

written by Lawrence S. Earley/illustration by Carol Lerner

Winter is as merciless as an arrow in flight. A raw February wind can extinguish the flame of life in a dove, or put a fatal chill in a man. Everywhere winter makes it hard on living things, and to survive they've had to adapt to this most hostile of seasons. Animals grow thicker fur, put on extra layers of fat, or hibernate. And ever since Prometheus stole fire from the gods, resourceful man has found all kinds of ways to keep his vital spark alive, from hearth fires to Holofil.

The plant world hasn't been exactly slack in adapting to winter. Ever since plants began to colonize the earth hundreds of millions of years ago, they have run the gamut of hot and steamy jungles, rainless deserts and arctic cold and ice. Out of these battles with hostile climates came hardier and more resilient plants, plants that were able to solve the problems posed by changing weather and soil conditions. You can look out your window today and see some of the ways they have adopted to survive.

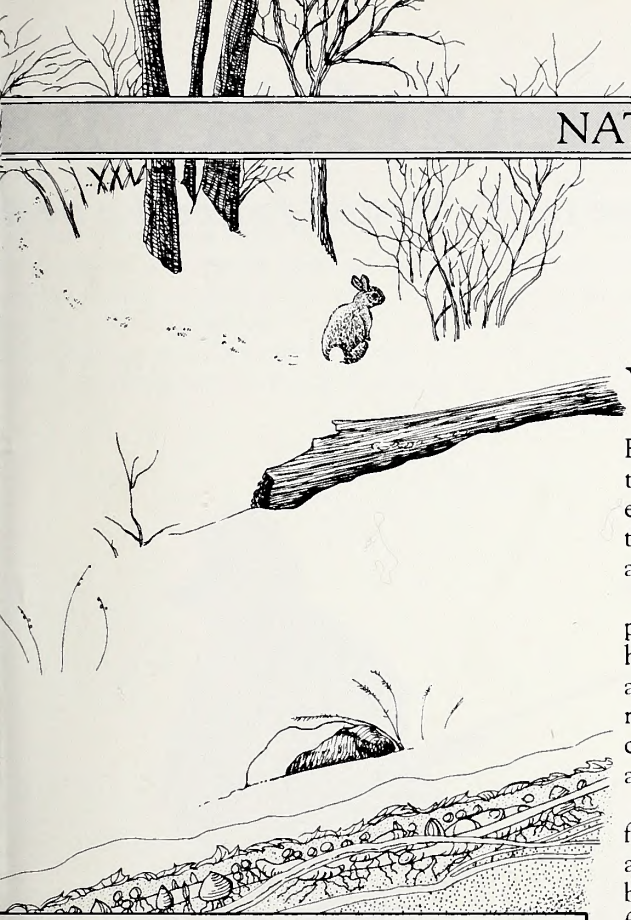
Take the deciduous trees, for example. In autumn the dogwood's leaves flamed red and dropped off. And a good thing, too. Trees require tremendous amounts of water. Drawn up through the trunk, the water is eventually lost by the leaves as water vapor by a process called transpiration. In winter, the frozen soil makes it hard for the roots to absorb water and so the tree drops its leaves which reduces the loss of precious water. But throughout the summer it has been producing replacements for the leaves in the form of winter buds, tiny leaves well-wrapped in protective scales that can withstand the iciest of winter storms. Like a business in hard times, the tree reduces the scale of its operations enabling it to survive. The evergreens — magnolia, pines and juniper — have adopted other strategies to allow them to live in this climate.

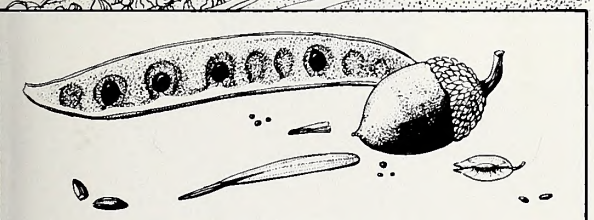
Wildflowers, and other perennials, have evolved another way to get out of the cold, so to speak: they've retreated underground. Unlike the dogwood tree, these short plants do not expose their winter buds to the air, but bury them. The stems and leaves aboveground die back each year, but the life of the plant is carried on in buds or a variety of food-storage organs underground: rhizomes, tubers, corms and bulbs. Snug underground, these buds and their food supplies can safely sit out winter and in the spring push through the thawing earth to become bloodroot plants, lillies of the valley, hyacinths and other flowering plants.

Another survival mechanism plants have evolved is the seed, so weather-resistant it is a triumph over winter. Seeds leave the parent plant by a variety of means, and within the tough shell is an embryonic plant — leaf, stem and root — and its food supply. These hardy little pilgrims are designed to live for months, years, or, under certain circumstances, for thousands of years until the right weather and soil conditions coax forth the new plant.

It would not do at all for nature to pack the future of the plant into an organism that would try to bloom in the middle of an ice storm. And so before seeds and winter buds can bloom, they must go through a dormant phase. In the fall, apparently triggered by decreasing daylight hours, plants shut down their growing activities and rest. The mature seed likewise shuts down operations for a time. Many plants and seeds must even undergo low or freezing temperatures before they can germinate. By entering this dormant phase they reduce their demands on the environment and increase their chances for survival.

At this time of year, when life is everywhere under siege, winter buds, underground organs and seeds all nurse the vital spark of life. In February's bleak landscape nature has stitched a green and wonderful promise.





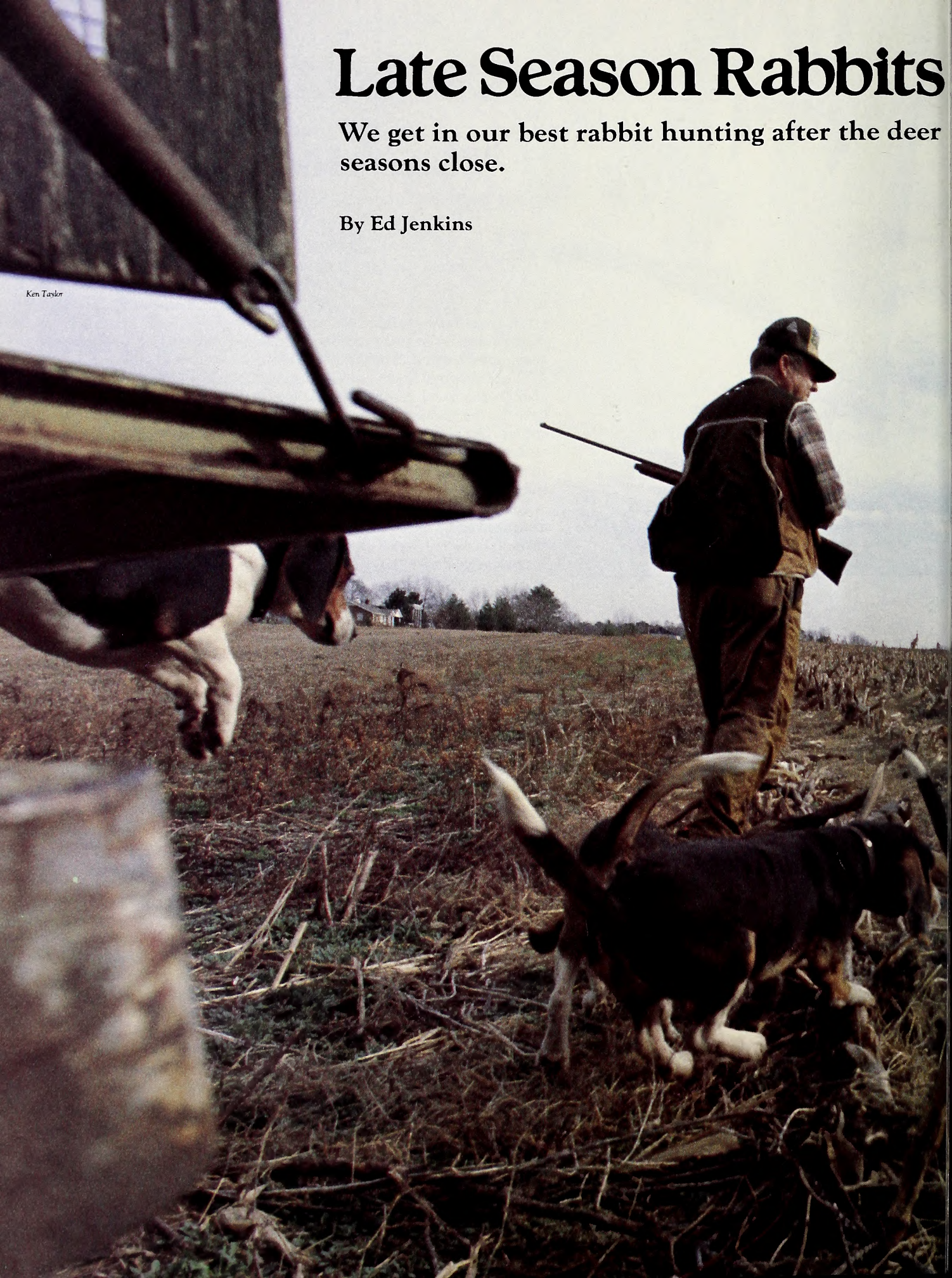
Each seed contains an entire plant with a tough protective covering. Expelled from the plant last year, the seed remains dormant during the winter and germinates with the right temperature and soil conditions, usually in the spring.

Plants take shelter in different forms to survive winter's cold. Trees drop leaves and entrust new life to tiny winter buds (above left). Perennial plants allow shoots aboveground to die back, while new buds are nurtured below the surface in rhizomes, tubers, corms and bulbs. Mobile seeds with weatherproof covers carry new life within.

Late Season Rabbits

We get in our best rabbit hunting after the deer seasons close.

By Ed Jenkins



Ken Taylor

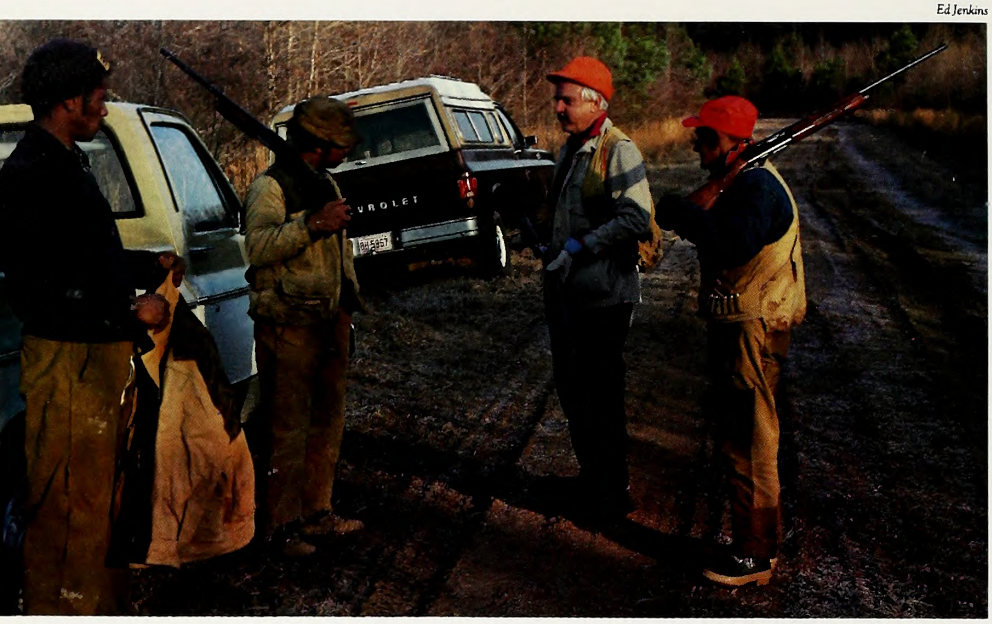
A thicket like all the rest — a tangle of briers, honeysuckle vines, and saplings. It was typical rabbit cover in the Halifax County cutover. I plowed ahead keeping my head down and body bent forward as I tried to keep my bright orange cap from being snagged from my head by the cat-claw briers and branches. A trickle of dried blood on my cheek marked an earlier encounter with a brier that cold January morning. Suddenly a blur, a glimpse of movement on the ground to my right, now gone. Was it something or just my imagination?

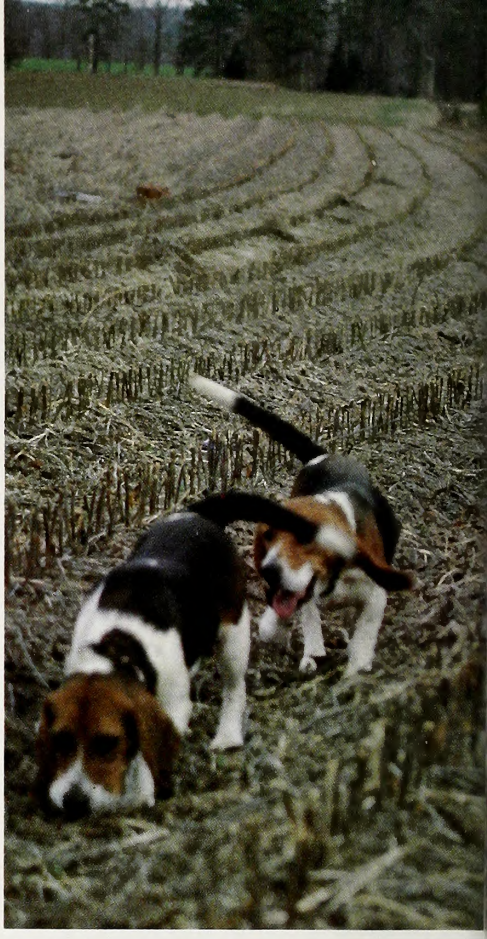
Almost automatically, the call burst from my mouth, "HERE-HERE-HERE-HERE! . . . HERE-HERE-HERE!" A bounding beagle in the thicket behind me signaled the arrival of the dogs — first one, then two, three — all running toward me in excitement. "HERE-HERE-HERE!"

As I pushed on ahead, the dogs began to comb the ground eagerly in search of the trail, their sensitive noses snorting loudly as they searched for the telltale scent. As their weaving search carried them under vine-covered branches and into brush piles, the dogs appeared to be battling each other for the first sweet smell of rabbit.

"HARK! HARK! HARK!" I yelled trying to convince the dogs that the scent was really there . . . but nothing. For a few moments I feared that maybe I was wrong,

Ed Jenkins





A morning spent hunting rabbits can put meat in the freezer and make a pleasant social occasion as well for (left to right), Jesse Hodge, Melvin Jones, Bill Smith and Ernest Bottoms. When deer hunting season is over, deer hunters and rabbit hunters can combine forces for better rabbit hunting.

maybe I hadn't seen anything, maybe . . .

The small mixed-breed beagle let out a squall as he finally caught the faint rabbit scent. The other dogs seemed energized as they scurried to the area of promise. Another dog opened as he struck the rabbit's trail, and in a split second a torrent of high-pitched chops and squalls erupted. The dogs were off and running in head-down pursuit of the ghost rabbit. The chase was on.

"All right!" I yelled, allowing myself a brief moment to savor the thrill of discovering the rabbit's getaway. Then I turned my attention to the dogs as they trailed the fleeing rabbit in full cry. Behind me bounding feet scattered leaves and a white and black dog flashed by, running through the cutover to join the chase. "Hark to 'em, Lady!" I yelled as the dog disappeared into the brown maze of brush. In a few moments the trailing dog had caught the pack and had joined the chase. The dogs' voices turned more to the right, then straightened out, and slowly began to swing back to the left. I eased forward to an area where the brush appeared to be thinner and where I thought I'd have a better shot. Sooner or later the rabbit would complete the circle and lead the dogs back to where he was jumped.

The squalls and barks of the dogs grew louder and were now coming from straight ahead. "He's heading back now," I thought to myself. I nervously fingered the safety of my Browning 12-gauge to make sure it was still on. The dogs were closing fast. I searched the area in front of me for movement that I knew would come. Suddenly the rabbit materialized out of nowhere. Pivoting, I pushed the safety off the Browning as I raised it to my shoulder,

Ed Jenkins

never taking my eyes off the bounding rabbit. The butt plate had not yet come to rest against my shoulder when the barrel covered the leaping rabbit and the shot rang out. "BAMM!" Another bound and then, behind a small clump of broom straw, the rabbit was still running. "BAMM!" Dirt and leaves flew up as my second shot also missed its mark when the rabbit suddenly dodged to the right.

"Missed!" I scolded myself as I rushed to the area where the No. 6 shot had raked an oval-shaped clearing in the ground. "How could I have missed both times?" Then remembering the oncoming dogs I hollered, "Here! Here! Here! Here!" The sounds of the gun shots and my voice brought the dogs on the run. When they reached the place where the rabbit veered, they picked up the scent again over the strong smell of burned gunpowder, and the chase continued.

Fifty yards away, in a small opening in the cutover, Ernest Bottoms smiled to himself. Two shots had rung out but the chase was still on. "Maybe I'll get a shot after all," he thought as the hounds headed his way. In his many years of hunting, he never tired of the sound of the chase. It truly was music to his ears. The excitement was still there, too. He had once heard it described this way. "If the barking and squalling of a pack of dogs running toward you and that faint 'tip, tip . . . tip, tip' sound of the quarry ahead of them coming through the brush don't put the hair on the back of your neck standing up or a chill down your spine, you might as well quit and go home, 'cause you've missed the thrill of the hunt."

The rabbit crossed the opening and never saw Bottom's 20-gauge automatic go to his shoulder. A single shot and the chase was over. The dogs still barking on trail got their first glimpse of the quarry as

Ken Taylor

they approached the old man picking up the rabbit. "Here-here-here," he murmured as he held the rabbit in his outstretched hand and offered each dog a last smell to signal the end of the chase.

When the dogs fell silent after the shot, I knew someone had killed the rabbit. For some reason I felt a need to see the animal I had missed. I began walking in the direction of the shot.

"What kind was he?" I asked as I came up on the small figure of a man.

"Blue tail."

I stepped closer and looked at the rabbit. Its smaller, dingy white (blueish) tail, darker brown color, and smaller feet and ears distinguished it from its cousin the eastern cottontail.

The proper name of the blue tail rabbit is marsh rabbit, sometimes pronounced "mash rabbit" by folks down east. As its name indicates, it prefers to live in wet bottomlands and swampy areas. When pursued by a pack of dogs, it does not make the long runs a cottontail will but prefers instead to stay fairly close, circle, and hide. The typical chase of the blue tail is characterized by periods of silence, as the dogs lose its trail, and sudden eruptions of barks and squalls, when they get back on track. This is no job for the amateur rabbit hound, and a wily old veteran is often called upon to straighten out the younger dogs. Marsh rabbits rely on a bag of tricks to throw off a pack of dogs. They will swim canals, run down water-filled ditches, and leap up on tree stumps and hide while the dogs rush past within a few feet, and then, as if unconcerned by the whole situation, jump off and hop away.

"He was flying when he came by me," said Bottoms.

"He was moving pretty good when he came by me too," I said, "but I put him in high gear before he left!"

We both laughed. If I hadn't brought it up, Bottoms never would have mentioned it. It just wasn't his style to ride someone over a missed shot. Not so Melvin Jones. And the crashing of limbs, snapping of entangling vines, and smashing of assorted flora under foot signaled his approach.

As I saw Melvin's smiling face coming through the woods toward us, I knew a good-natured ribbing was about to be served up, and I was to be on the receiving end. "Deadeye Ed!" he blared. Then he hollered to the rest of our unseen hunting party, "Okay fellas, ante-up some extra shells for Ed. He's got to be getting low with all that shooting." I could hear laughs and comments coming from the woods around me as the others got in their two cents worth.

"Look at that," I said as I pointed at the rabbit Bottoms was getting ready to hang in the fork of a small sweetgum tree where it would cool. "Fleas!"

"Now don't try to change the subject, Deadeye," Melvin said with a laugh as he gave me a friendly nudge on the arm. Then tilting his head back slightly, he peered at the rabbit through squinted eyes. "Good Lord! Have you ever seen so many fleas in your life? Makes me itch all over."

As the three of us watched the twitching fur caused by the exodus of fleas from the cooling rabbit, I couldn't help but wonder if such a large number of fleas was natural or if it indicated a problem.

My question was answered several days later when I paid a visit to Grady Barnes, a biologist with the North Carolina Wildlife Resources Commission. Grady gave me a crash course in "rabbit fleaology" which boils down to this: Lots of rabbits — lots of fleas; few rabbits — few fleas.

The reason is quite logical. Fleas lay their eggs on the ground where they hatch. In areas where the rabbit population is moderate or low, the young fleas may die before they come in contact with a host animal. Conversely, where the rabbit population is high, the young fleas are picked up by rabbits passing through the area. When fleas become numerous on an animal, they will weaken it and reduce its chance of survival. As the number of rabbits decrease, so does the contact with fleas and consequently the number of fleas decrease.

It's just one small part of nature's plan of population control. The area where we were hunting has plenty of hawks, foxes, and bobcats, but there is also plenty of thick cover to hide rabbits. In places such as this, predators and hunting pressure cannot keep the rabbit population in control, so disease and parasites claim a large number of rabbits. But this is not as bad as it may appear.

The reproductive capabilities of rabbits are well-known. A female rabbit's first litter of four or five young will be born in early March. She may have five litters during the year, and even some of the females from her first litter may bear their own young that year. It doesn't take a math whiz to realize that if the population is not effectively controlled, rabbits would soon overrun this country as they have in parts of Australia where they are considered pests. This, of course, will not happen here because rabbits are native to the country, and natural controls are better established for them. Even in Australia, where a lack of predators allowed booming populations, disease and other factors compensate for other forms of mortality. The land will only support a certain number of animals. It may not fit one's perception of how life should be, but

Ken Taylor

Beagles may sing for their supper after a long morning cutting through briers, and a rabbit chase or two has been known to put a hole in a man's stomach.

Tactics For Rabbits

— It is *not* illegal in North Carolina to hunt rabbits in the snow. However, in any kind of severe weather, rabbits are hard to find. Some hole-up and refuse to move unless almost stepped upon. On cold, windy days, look for rabbits in areas where the wind is blocked and places where they can warm themselves in the sun. As the weather improves, rabbits will become more active and hunting success will improve.

— Rabbits "freeze" and rely on their camouflage to hide them when danger is present; if discovered, they rely on headlong flight. It is a good practice when hunting rabbits to occasionally stop and pause. A rabbit that may be lying nearby may make a break for it.

— Always wear a bright orange hat or vest when hunting rabbits. It is a good safety precaution that helps hunters keep track of everyone's location.

— Rabbits feed heavily at night, early morning, and late afternoon. In early morning and evening, be sure to check out the cover and brushy edges next to paths and grassy areas where rabbits feed. During the middle of the day, look for rabbits in thicker cover.

— Old home sites that have grown up in vegetation offer good cover and hunting for rabbits. Stomp on pieces of tin roofing and piles of boards and trash to flush hiding cottontails. Watch out for old abandoned wells that may be covered with brush or trash.

that's the way it is and the only way rabbits in the wild can continue to exist.

My thoughts drifted back to our hunt and the flea-covered rabbit. More than likely that rabbit would have met his end, as so many more in this area did, after the hunting season.

Back in the woods that afternoon, Bottoms wasn't worrying about the fleas. "They won't hurt the taste none," he said.

"They got another one going," said Melvin turning his head to listen to the dogs' squalling. We were back in the hunt, and we drifted back to areas we thought the rabbit might try to cross.

Eventually the hunt and the day came to an end. Men and dogs straggled back to where the pickup trucks had been left that morning. One of the dogs, an old white-faced female named Nancy, had already made a bed in some broom straw near her owner's truck. She looked up as the soothing warmth of a setting sun was blocked leaving her blanketed by the long, cool shadow of a man.

"Tired, girl?" Bottoms consoled the dog as he reached down to her. After three quick pats to the dog's head, Bottoms turned to her owner, a tall, thin, black man with an ever-present cigarette wedged between his lips, and said, "They ran good today, Slim."

"Yeah, they did," acknowledged Slim Hedgepeth with a hint of pride in his deep voice, then added, "That they did — didn't run no deer either."

That seemingly innocent remark is worth a bit of explanation because the success of this and other hunts we have shared is closely tied to deer.

"A deer is nothing but an overgrown rabbit — where you find one, you'll find the other" — or so I was once told. This advice was given to assist me in bagging a buck, but there is no reason why it can't help rabbit hunters locate their quarry.

One reason some rabbit hunters may be seeing their kills decline is that many of the good hunting areas are now private. Rabbit hunters for all their interest in their sport can't afford to lease the hunting rights on large tracts of land. As the deer herds in North Carolina continue to expand and are pursued by an increasing number of deer hunters, many rabbit hunters are finding themselves hunting smaller, less productive areas and areas where hunting pressure has increased.

One solution is quite simple and beneficial to deer and rabbit hunters alike. When the deer season goes out at our hunting club, we contact some of our rabbit hunting friends and get together for some great late-season rabbit hunts. To the rabbit hunter, the opportunity is attractive because here is a large area with ideal rabbit cover that has not been hunted all year. Also at this time of the year, the deer population has been reduced to a point that the rabbit dogs are less likely to chase deer. The deer hunters benefit by extending their hunting season by switching from "flag tails" to cottontails.

The deer hunters supply the place to hunt, the rabbit hunters furnish the dogs, and the rabbits supply the action. It's a great way to meet and enjoy new friends and to share the game with others. However, its a good idea to leave behind those dogs that love to run deer or else you may have an early end to your hunt and dogs scattered across the county!

If you're fortunate enough to get in on some late-season rabbit hunting after the deer seasons have closed, you may decide that rabbit populations in North Carolina are not as low as you thought. And if so, that will be sweet music to the ears of rabbit hunters — almost as sweet as the sound of a pack in full chase.

The Armchair Sportsman

One man's admittedly prejudiced list of favorite sporting books and stories.

By Jim Dean

A good companion can make a lot of difference on a hunting or fishing trip, and over the years I've been with some of the best. I've fished with Ernest Hemingway, Nick Lyons, William Humphrey and Richard Brautigan. Some of my hunting buddies have been William Faulkner, Havilah Babcock, Robert Ruark and Vance Bourjaily. Good company, by and large.

We didn't always catch or kill anything, but together we've seen some amazing country, had a few narrow escapes, and perhaps learned something. And if Papa got a bit boorish — as he is apt to do at times — or if little Bill Faulkner had one bourbon too many and began to speak in tongues — as is his inclination — I just closed the book. That's one good thing about books. You can quit reading when you get tired, and you don't have to fillet any fish or skin any squirrels.

There are plenty of books and magazine articles that tell you various ways to bag a trophy deer or catch a trout, and some are well-written although few qualify as literature. Indeed, I have the impression that there are few literary classics in the outdoor field. Over the years, however, I have read a number of well-written books and stories which I suspect you might enjoy as much as I have. My preferences are admittedly personal, but if you like to curl up in front of a fire with something more substantial than a "how-to" article on rigging plastic worms, read on.

One problem arises. Many of these books and stories were published years ago, and some of the authors have been dead for years. Therefore, much of this material may be long out of print. If local book stores don't have what you're looking for, they may be able to order it. If not, I suggest you try your local library. If all else fails, you may wish to order a list of out-of-print books — many of them valuable collector's items — from a book company such as Angler's & Shooter's Bookshelf, Goshen, Connecticut, 06756. Please don't write us at *Wildlife In North Carolina* because we can only refer you to the sources I just mentioned.

Let's begin with North Carolina's native son, Robert Ruark. His books, *The Old Man And The Boy* and *The Old Man's Boy Grows Older* are delightful, and an excerpt from the former was published in these pages recently (December 1982). While an editor might wish that he could change many of Ruark's sentences and eliminate

some of the cliches, these books give a glimpse of eastern North Carolina through the eyes of a young hunter and fisherman living there in the 1930s. Ruark's African hunting books, *Use Enough Gun* and *Horn Of The Hunter,* are also recommended. Ruark is easy to read, and I envy anyone reading these books for the first time.

In the early 1970s, I read a long article in *Esquire* magazine titled "The Sex Life Of A Salmon Is Swift And Terrible." Written by William Humphrey, it was later published in book form by Alfred Knopf and is a classy bit of writing. I have never caught a salmon — probably never will — but that hardly matters. The "spawning run," refers not merely to the fish, but also to some of the fishermen who visit the English fishing lodge where much of the story takes place. Not every guest, as you will see, is angling for a trophy fish.

Nick Lyons, a publisher and occasional contributor to magazines, has also written several fine books, the most notable in my opinion being *The Seasonable Angler.* The subject is trout fishing, and one chapter titled "Mecca" captures the zany obsession of this sport perhaps better than anything I've read. Lyons also edited a collection of excellent fishing articles and stories available in a book titled *Fisherman's Bounty.* My favorite in this collection is "The Carp," written by Leslie P. Thompson. It is a fascinating view of one man's devotion to what many consider a lowly form of fishing.

Peter Corodimas has edited a similar collection in a book titled *In Trout Country,* and again, the writing is superb. Ernest Hemingway's "Big Two-Hearted River," and Paul O'Neil's "In Praise Of Trout — and Also Me" are included, both highly recommended. O'Neil's piece first appeared in *Life* magazine. Also included are two stories by Richard Brautigan, "The Cleveland Wrecking Yard," and "The Hunchback Trout." Both originally appeared as chapters in Brautigan's bizarre, perplexing and often hilarious book, *Trout Fishing In America.* I hardly know what to say about Brautigan, except that his work is probably an acquired taste. Some scholarly types who have reviewed *Trout Fishing In America* discount the fishing altogether, especially when they learn that the book title is also the name of a character. The book is strange, and indeed, in one story in the book, "The Cleveland Wrecking Yard," a used trout stream — stacked in various pieces — is found for sale in a junkyard. Yet, somehow much of it works as a humorous and often disturbing commentary on this country's eroding natural heritage and values. While parts of this book are silly and meaningless — perhaps even an intentional joke on the reader — this much is certainly true: Brautigan is a serious fisherman and the fishing he writes about has appeal. You may feel a great kinship with him.

William Faulkner may share little in common with Brautigan except that he is sometimes difficult to read. This highly respected author has written several books, and many short stories, that deal with hunting. I suspect that "The Bear" may be one of the most absorbing short novels ever wrapped around a hunting motif. I am also especially fond of his short story, "The Old People," and the opening description of the first sighting of a trophy deer by a boy and his Indian mentor is enough to give you buck fever. Both are found in *Go Down, Moses.* Faulkner knows his hunting. Start with *The Big Woods,* a collection of his hunting-oriented work, but if you've never read him before, don't expect to find the going easy.

Hunting and fishing figure in many of Ernest Hemingway's novels and short stories, although like Faulkner and some of the others mentioned here, Papa used these sports largely as vehicles to handle a more important theme. His writing is easy to read, however, and almost always absorbing. Try *The Green Hills Of Africa, The Snows Of Kilimanjaro* or his last book, *Islands In The Stream.* My guess is that you'll end up reading everything else he wrote, as well.

Vance Bourjaily was both admired as a writer by Hemingway, and perhaps influenced by him. His book, *The Unnatural Enemy,* is a collection of superbly written hunting stories. I quarrel only with his choice of title because I do not believe that man's predation is unnatural, but that is a minor point — one I'm not even sure that Bourjaily would argue.

For pure fun, you can hardly beat Havilah Babcock for his humorous and loving stories about quail hunting. Babcock was an English professor at the University of South Carolina before his fairly recent death, and also taught at Elon College in Alamance County as a young man. Among his best collections are *My Health Is Better In November, I Don't Want To Shoot An Elephant,* and *Jaybirds Go To Hell On Fridays.* One friend of mine who was fortunate enough to take Babcock's English course at South Carolina told me that most anyone could get a "B" with a modest bit of work, but an "A" was given only to the student who took the old master hunting. My friend got his "A."

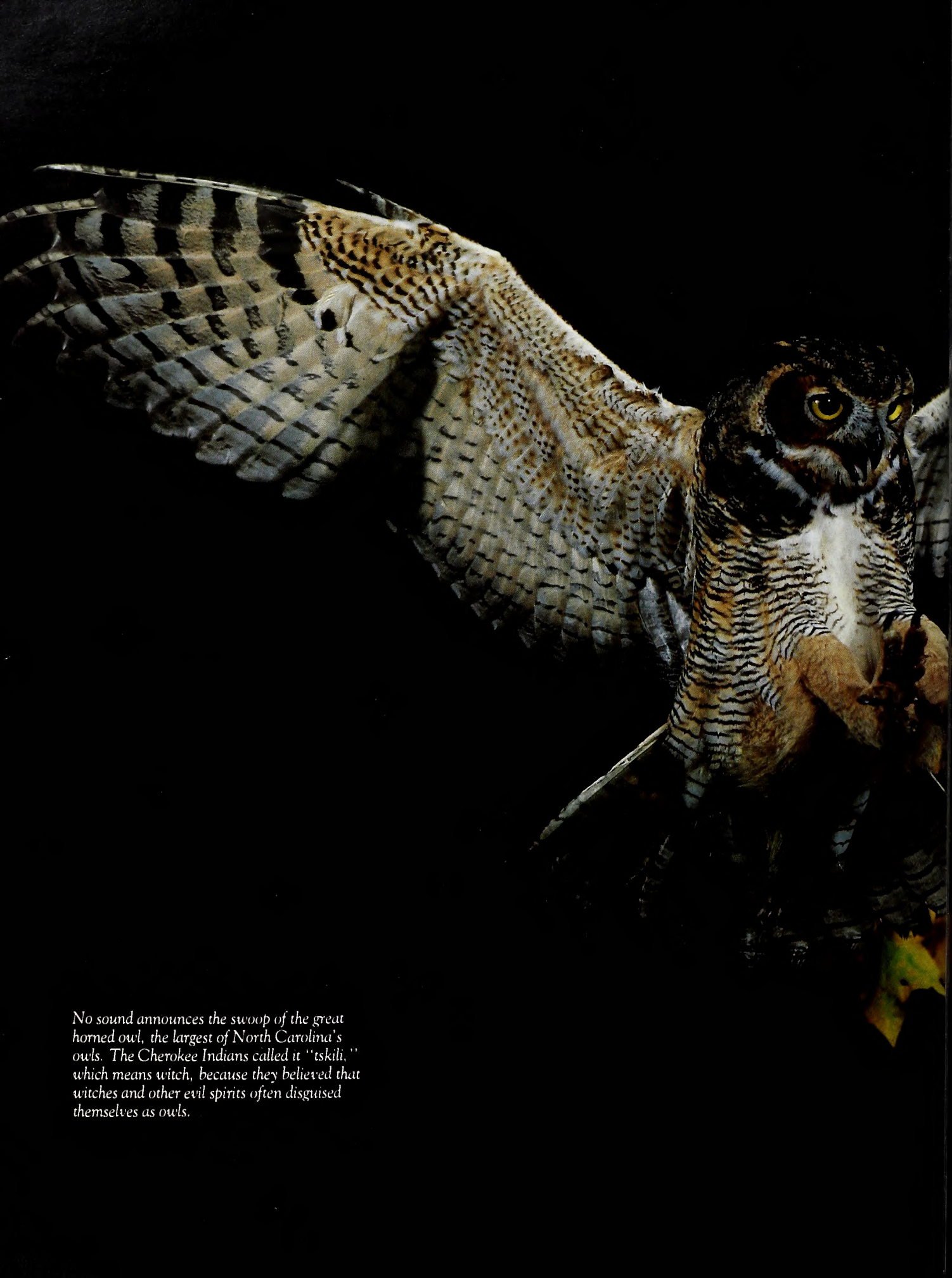
Ed Zern is another writer of humor who deserves your attention, and may already have received it through his regular column, "Exit Laughing," in *Field & Stream* magazine. His books, *How To Catch A Fisherman, To Hell With Fishing* and *To Hell With Hunting* will have you chuckling long into the night.

Several other writers who were essentially columnists are worth mentioning. Red Smith, recently deceased, is far-and-away better known for his deft newspaper columns and articles on athletic sports, but he has also written some excellent short pieces on fishing and hunting. You might look for them in *To Absent Friends,* a recent collection of his columns. Likewise, John W. "Jack" Randolph, who was outdoor editor of the *New York Times* some years ago, wrote with a tight and enviable style that is still much admired. A collection of 100 of his best columns was published in *The World of "Wood, Field & Stream"* in 1962.

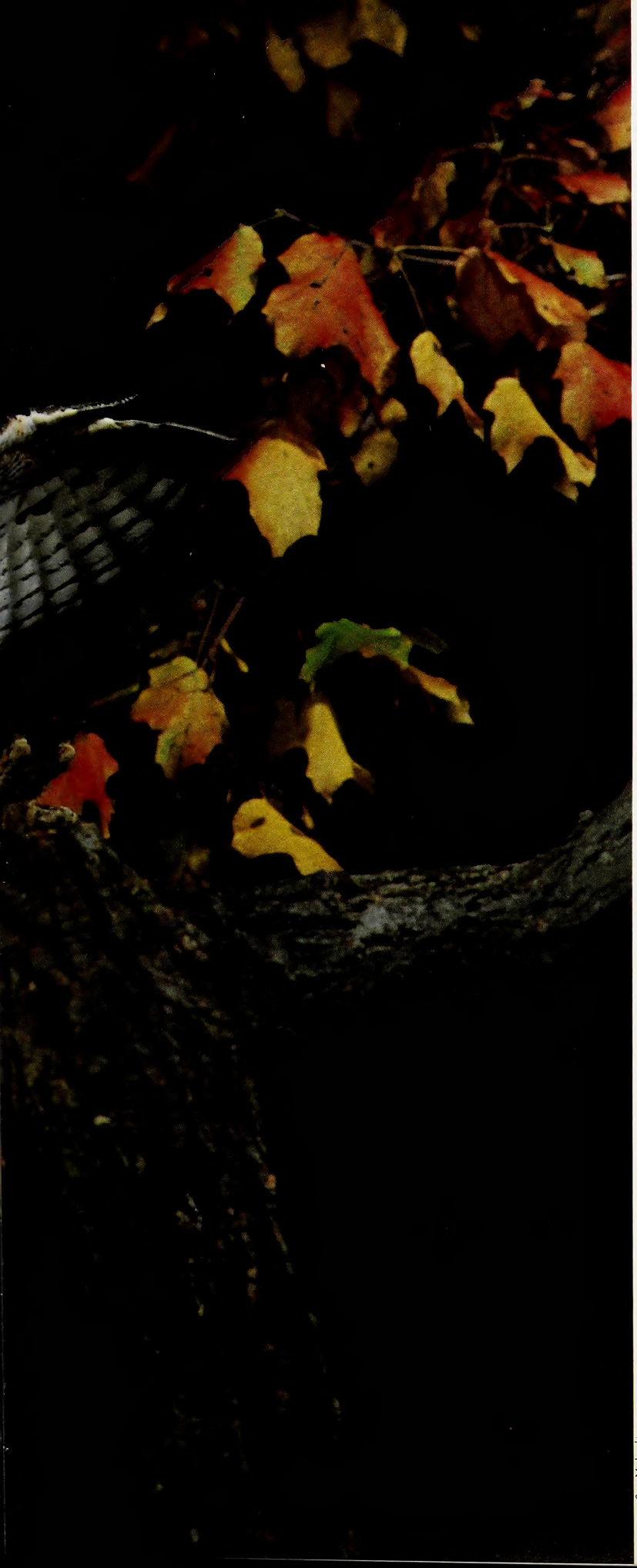
Roderick Haig-Brown's many books on western trout and steelhead fishing are enjoyable to read because they are carefully crafted and evoke such a pleasurable mood. Try *A River Never Sleeps* or *Return To The River.* Reading Haig-Brown reminds me of Robert Traver's remark that while fishing might not be so important, he suspected that many of man's other pursuits were equally unimportant, and not nearly so much fun. Traver is also worth reading. His real name is John Voelker and he is a barrister in Michigan's upper Peninsula. His most famous work is *Anatomy Of A Murder,* but an outdoorsman will probably find his book *Trout Magic* less important but far more fun.

Two other writers come to mind, although they may seem out of place here. Horace Kephart, one of the founding fathers of The Great Smoky Mountains National Park, wrote *Our Southern Highlanders* in 1921. It is read chiefly for its in-depth view of a rapidly disappearing way of life, but it contains some fascinating hunting sequences. Annie Dillard's *Pilgrim At Tinker Creek* has nothing specifically to do with hunting or fishing, yet her unsentimental view of the natural world around us is likely to be far different from anything else you've read.

No doubt you have your own favorites, perhaps some of them mentioned here. And perhaps you'll agree that these authors offer good company for a sportsman deep in the throes of an armchair winter. Even if you've read them before, you can always do so again. Sometimes the second trip is better than the first.



No sound announces the swoop of the great horned owl, the largest of North Carolina's owls. The Cherokee Indians called it "tskili," which means witch, because they believed that witches and other evil spirits often disguised themselves as owls.



Steve Maslowski

The Night Hunters

We've cherished the owl as a wise old bird, and shot it as a predator. Our conflicting attitudes toward owls threaten them today.

Fifteen thousand years ago, a stone-age artist made his way deep into a cold, damp cave along a passageway flanked by carved and painted lions' heads. He stopped in a chamber filled with colorful wall paintings of strange and hybrid animals. Squatting in the dim torch light, the artist etched a fine outline into a rock with a sharp flint, adding touches of charcoal and ochre for color. His artwork, a pair of snowy owls and their young, is still there today — the earliest record of man's continuing fascination with owls.

What did the owls mean to this artist? Why did he painstakingly chisel their images into the walls of this cave in modern-day France? We'll probably never know for sure, but we do know that nearly everywhere on earth owls have excited an odd mixture of love and hate, fear and reverence in the hearts of men. In many countries, the call of an owl has been feared as a prophecy of death, yet owls are popular symbols of wisdom. They have been called upon to ward off lightning and cure diseases, and they have been shot for killing poultry and game birds.

by Jane Rohling

Steve Maslowski

The great horned owl, barred owl (fledgling, above), and screech owl (far right) are the most common North Carolina owls. The barn owl (middle) was quite common at one time, but is less so today. Sometimes known as the "flying rat trap," the barn owl is the most efficient predator of rodents in nature. The Cherokee name for the barred owl, "u'guku'," was an imitation of the sound it makes. "Who cooks for you? Who cooks for you al-l-l-l-l?" is one English interpretation of the barred owl's call. The screech owl scrunches against a pine tree in picture at far right, but is a doughty defender of its nest. After eating its prey whole, owls regurgitate fur, bones and feathers in small pellets (lower right). Biologists have used these pellets to prove that the owls' diet consists mainly of rodents and other pests.

Even today, when owls are protected by law, myths and misconceptions abound about this feathered predator. Some people still wage private wars against all birds of prey, not knowing that owls are among the most valuable creatures on earth.

At least part of the love-hate relationship between man and owls stems from the fact that owls, like hawks, are among nature's most efficient predators. Perhaps we just don't like killers — even killers with a strangely humanlike appearance. Owls face the world with an upright posture, cheeklike facial discs, a flat face with big, round, forward-facing eyes, and a beak that projects just where a nose should be — uncanny little caricatures of ourselves. But when an owl has to defend itself or its nest, it presents a much different character, indeed. The body feathers are ruffled so that the bird appears twice its size. The wings are rotated forward and spread wide. The enemy is faced with one of the most intimidating displays in the bird world, made even more effective by snapping mandibles, hissing, and glaring eyes. As a result, owls have

When the animals and plants were created they were told to watch and keep awake for seven nights. All tried, but only a few remained awake the entire time. Some fell asleep the very first night, and even more fell asleep the second and following nights. Of all the animals, only the owl, the panther and a few others remained awake during all seven nights. So, to them was given the power to see and go about in the dark and to prey on the birds and animals which must sleep at night.

Cherokee Legend

Steve Maslowski

Jack Dermid

Jack Dermid

very few natural enemies.

Nearly everything about an owl has been developed over time for efficient killing. Take its nocturnal habits and ability to see in the dark, for example. Can it see in the dark? Well, eyes are basically light-receptors, and despite their enormous size, owls' eyes are no different. Total darkness is rare in nature, and owls are well-equipped to make use of even the faintest glimmer of light. Although their eyes are specialized for night vision, they can see very well during daylight also. Owls have simply evolved to fill a nighttime niche to avoid competing for food with hawks and other daylight predators.

The frontal positioning of owls' eyes and their ability to blink with the upper eyelids (not lower, as in other birds) make them look like humans, but they have survival value also. They give owls binocular vision, enabling these superb predators to judge distances accurately before pouncing.

An owl's cheeklike facial discs play a specialized role in its ability to hunt by night. The rings of stiff, curved facial feathers act as sound gatherers, much like a hand cupped behind a human ear, funneling sound to the owl's eardrums. The ear openings themselves are large slits on the sides of the head. They are often lopsided, differing in size and shape, which results in a slightly differing tonal message received by the brain. This is enhanced by the breadth of the owl's head, since the ears are far enough apart to create a time difference between the arrival of sounds in each ear. All of this helps in locating prey in the dark.

For some owls, supersensitive ears that guide the attack may be more important in hunting than the eyes. In fact, recent experiments with barn owls have proven that they are successful in catching living prey in absolute darkness, provided there is some audible clue to betray the victim.

With eyes that are 35 to 100 times more light-sensitive than ours, and hearing that can detect and locate the slightest rustle of leaves under the most light-footed mouse, it is no wonder owls have no trouble going about their business under conditions that would leave us helpless. But owls have an added advantage in hunting at night: silent flight. Owls hunt by two methods: they ei-

The tale is told that once a white man said to a Cherokee (it had not rained for a long, long time), "It is so dry — it has not rained in so long! When do you think it will rain?"

The Cherokee said, "It will rain today because I heard a hoot owl."

The white man said, "You are very wise."

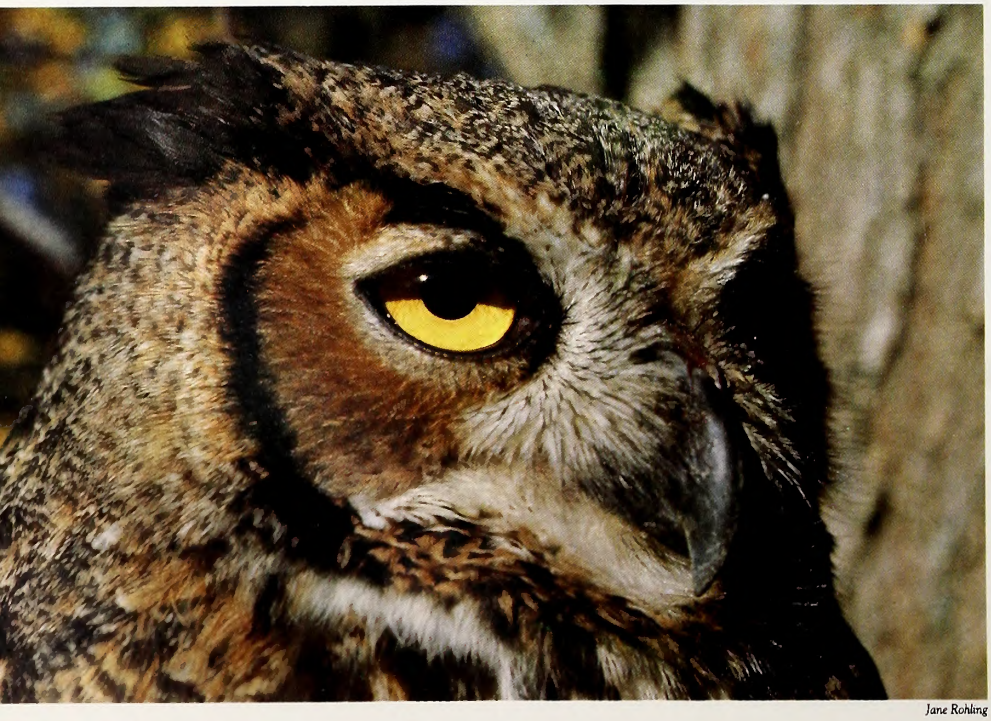
But some days later the white man met the Cherokee and asked him why it had not rained when he said that it would rain.

"Well, the hoot owl said it was going to rain, and when he says it is going to rain, it usually does. But this one happened to be a very young one who didn't know anything yet."

If you would like to learn more about owls and owl myths, you might enjoy reading Owls: Their Natural and Unnatural History *by John Sparks and Tony Soper.*

Karl Maslowski

The saw-whet owl (right) is mostly a winter visitor, although some saw-whets may breed here. Other migratory owls that visit North Carolina are the long-eared, short-eared and snowy owls. The screech owl (red phase, middle), barred owl (adult, far right) and other owls are superb predators, with sensitive eyes and ears, a hooked beak, sharp talons and muffled wings. The great horned owl's eyes (below) seem to follow you as you walk around it, but it's not true that owls can turn their heads in a complete circle. They can turn their heads 270 degrees, but snap them around to the other side in an eyeblink.



Jane Rohling

ther sit quietly, watching and listening for any tiny movement or rustle on the ground below, or they fly slowly and close to the ground in search of their prey. They are not built for speed and so must rely on stealth. The owl owes its silent flight to built-in sound dampers that allow it to drop noiselessly out of the sky. This is accomplished with primary wing feathers that are finely fringed on the leading edge and covered all over with a velvet pile. There is no telltale rustling or whistling as air passes over the

Karl Maslowski

feathers as in other birds. As one author says, "No sound embarasses the hunter in tracking down his victim by ear, no sound warns the victim of the imminence of danger."

For those animals unfortunate enough to fall victim to this formidable predator, death comes quickly. At the moment of impact with their target, the owl's strong leg muscles automatically jerk the toes into a fist, driving the piercing talons home. With the help of sensitive whiskers around its beak, the owl puts its prey out of its misery with a single neck-snapping bite. The owl's meal is then eaten, and a few hours later, the indigestible parts of the meal — such as fur, feathers, bones or shells — are brought back up in a neat, oblong pellet.

These pellets have provided invaluable evidence of what owls eat — and an owl's diet has been subject to many misconceptions. Owl pellets have shown that owls eat enormous quantities of rodents. Over 90 percent of a barn owl's diet consists of animals that are injurious to crops. At least 75 percent of a screech owl's diet is made up of mammals and insects considered harmful, while only about seven percent is birds, including many pest species like blackbirds, starlings and English sparrows. Owls have been shown to be more effective at controlling rodent populations than hawks or any other predators. In California, the value of a single barn owl as a rodent predator has been placed at $20-$50 a year.

All of this should mean that farmers would treat owls as friends and allies, for of all the farmer's enemies, the worst of them are insects and rodents. Rodents eat seeds, and wherever man has planted and stored cereals rodents have flourished. In the South, the cotton rat does a great deal of damage to staple crops, and in California ground squirrels and pocket gophers destroy 10 percent of the crops each year. Insects are responsible for destroying uncounted thousands of tons of grain every year.

Indeed at one time farmers recognized the value of owls and built nest boxes in their barn rafters for them. But many farmers today consider owls enemies and are greeting them with shotguns instead. What's caused the change?

The answer lies in changing agricultural practices. Farms have become "cleaner" — hedgerows and wooded areas have been cleared, and wetlands drained, using all available space for crops. Thousands of acres of owl habitat have been lost. On top of this, huge barns of hand-hewn timbers with their lofts and silos have been replaced in today's agri-businesses with factory-built,

Karl Maslowski

steel-roofed sheds, and new types of storage bins that keep grain safe from foraging rodents. As a result, rodent populations have fallen and owls are responding by raising fewer young or none at all. In some cases they are switching their food sources to poultry.

Farmers with large flocks of poultry create artificially high prey populations which attract predators. Under these conditions, high losses have to be expected unless the prey animals are given adequate protection from the predators. Although most owls rarely take poultry, a few great horned owls may become accustomed to the easily obtainable food supply and return nightly to the same poultry flock. Outraged farmers have responded predictably, forgetting about the beneficial functions of owls and other raptors.

But it's not only farmers who have taken to shooting or trapping owls and hawks. Some hunters, convinced that these predators are responsible for decreasing game populations, are also part of the extermination effort. In the early days of wildlife management, game biologists believed that the best way to increase game populations was to eliminate predators. These early managers had failed to recognize the important role predation plays in natural ecosystems, and often their predator control programs had much different results than they had hoped for.

We now know that where the raptor population is greatly reduced, rodents tend to reproduce faster than game birds, adversely affecting the vegetation and competing with them for food. The increased rodent population may attract and hold larger numbers of predator populations, also. Elimination of great horned owls and other raptors has increased populations of skunks and other small mammals that in turn have destroyed more of the eggs and young of game birds in an area. Eventually, game managers found they had to undertake some form of rodent control to counteract the effect of their own predator-control program. The result was an unbalanced environment where populations of predator and prey species tended to fluctuate widely — and more and more human controls were needed.

Today, wildlife management emphasizes making game animals less susceptible to predation by providing a high quality habitat, with plenty of food and cover. Improving the habitat raises its carrying capacity so that it can sustain larger game populations. If game populations are down, sportsmen should blame the low part of the population cycle, failure of the food supply, or adverse weather conditions. Raptors are probably not the reason.

Many species of owls are reacting to the loss of woodland habitat by adapting to urban life. They have altered their diets to feed on more domestic species of rodents found around derelict buildings and garbage dumps, as well as on pest birds like the English sparrow and the starling. Even if owls are able to adapt to new environmental conditions and new food sources, there are other threats they may not be able to cope with, such as pesticides and automobiles. Even the legal protection they now have cannot protect them from these dangers.

Changing agricultural practices brought the widespread use of chemical pesticides in the 1950s. Owls with preferences for hunting in woodlands may have been hurt relatively little by the effects of crop sprays, but owls like the barn owl, which hunt over open fields, have suffered greatly from the effects of pesticides in their food chains. The result: egg shells that were absent or too thin to protect embryos.

Many owls become highway fatalities every year. One Ohio study showed that the screech owl was the second most commonly killed bird on that state's highways. Because of the openness of roadways, especially those running through forested areas, owls tend to perch or hunt near them. But an owl intent on catching its prey pays little heed to approaching vehicles, and is quite often struck and injured or killed.

Owls have been on earth for over 60 million years, and for at least 15,000 of those years they have provided us with food, enriched our art, literature and folklore, and protected our crops. But the changes we have brought about in their environment have threatened them as never before. For all our traditional fear of the owl as a symbol of death, today it is the owl who should fear man as a messenger of mortality.

A Helping Hand For Raptors

Raptor rehabilitation centers like the Carolina Raptor Rehabilitation and Research Center (CRRRC) in Charlotte are springing up all over the country. They are dedicated to caring for wounded or poisoned raptors.

"The raptor problem is a people problem," says Dr. Richard Brown of CRRRC. Dr. Brown advises farmers to keep poultry in covered pens to protect them from raptors, and he encourages farmers who have problems with individual birds to contact the CRRRC for assistance before killing all raptors on sight.

Dr. Brown suggests that one way we can lend owls a hand is by building nest boxes for them. With the disappearance of much of our old-growth forests, birds that nest in tree cavities are finding it hard to find homes. Simple plans for building nest boxes for barn owls and screech owls can be gotten from the U.S. Fish and Wildlife Service and the National Wildlife Federation. Wood duck boxes are suitable for barn owls and screech owls, and the N.C. Wildlife Resources Commission has detailed plans for their construction. Write: N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, NC 27611.

Owls are "branchers" — before they learn to fly, they leave the nest to sit on nearby limbs. They are slow to fledge, and this period may last several weeks. At this time, they would appreciate a convenient perch, fairly near the entrance hole of the nest box.

During this branching period, people often see owls sitting in trees and, thinking they are orphans, take them home. It is best not to disturb the fledglings, as the parents are probably nearby. If you find an owl that has fallen from the tree and is unable to climb back up, place it in the tree on a limb as close to the nest as possible. But beware — if the parents are watching, you may be attacked!

If you find a young owl that you are sure has been orphaned, contact the nearest raptor rehabilitation center as soon as possible so it can receive specialized care. Dr. Brown says the biggest problem with these young birds is that they become imprinted to people very quickly — they think people are owls and form strong associations that are difficult to break later. One of the major problems raptor rehabilitation centers face is teaching imprinted birds to fear people again before they are returned to the wild.

Owls do not make good pets and it is illegal to keep one or to take them from their nests without a permit from the Wildlife Commission. If you find an orphaned or injured owl, call the Raptor Center at (704) 597-4958, or the Wildlife Commission's toll free number, 1-800-662-7137, for assistance.

The Lady Could Shoot

The legendary Annie Oakley was a shooting instructor in Pinehurst after she retired from Buffalo Bill's "Wild West Show."

Buffalo Bill Historical Center, Cody, Wyoming

America's leading "sex symbol" in the 1880s was a young girl from Darke County, Ohio, named Annie Oakley. She was also perhaps the greatest trick rifle shot the world has ever known.

By Mark Taylor

The small, gracious white-haired woman who often sat on the front porch of the Carolina Hotel at Pinehurst during the winter of 1917 usually kept busy reading her Bible or working on needlepoint. Wealthy sportsmen who whiled away the winter months shooting quail in the Sandhills treated her with unusual deference — she not only had a kind word for everyone, but was perhaps the greatest rifle shot the world had ever seen.

From 1915 until 1922, the Carolina Hotel was the winter home of Annie Butler — better known as Annie Oakley. After retiring from the Buffalo Bill Wild West Show, she and her husband and manager, Frank Butler, earned a modest living teaching wing-shooting and trap-shooting to the wealthy residents of the area. Her students included John Philip Sousa, the well-known composer (who was an excellent trap shooter), John D. Rockefeller, Booth Tarkington, and Edgar Guest. These men — and many women — could not have had a better teacher. Annie was a superb shot with a pistol or shotgun as well as a rifle.

It had been a long road from Darke County, Ohio, where Annie was born in 1866, to Pinehurst, North Carolina. She was one of seven children in a pioneer family. Her father died of pneumonia after being caught in a blizzard, and for four years — beginning when Annie was 6 — she and her brothers and sisters were placed in foster homes and orphanages. When her mother re-married, the family was once again united.

From the very beginning, Annie Oakley showed a strong aptitude towards hunting, guns and the outdoors — at a time when most women shunned these activities. When she was six, she shot her first quail with an ancient flintlock rifle that the family had brought west from Pennsylvania. At the same time, she tended a string of quail traps to provide fresh meat for the family. After her mother's second marriage, Annie was free to roam the woods at will.

Her favorite firearm was a 20-gauge shotgun which she used to good effect. Frenchy LaMotte, a nearby storekeeper, shipped game birds to the restaurants of Cincinnati where wild game was a staple of most menus. He grew to appreciate the carefully packed hampers of quail that the young girl brought in. More often than not, the heads were neatly blown off with a single shot. Rabbits, pheasants and squirrels also fell to her gun. She was soon one of his most reliable market hunters, and her shooting prowess was known throughout Darke County. Her parents encouraged her hunting. Cash was hard to come by on the frontier, and her shooting helped pay the mortgage on the family farm.

How did Annie Oakley become an exceptional shot? Even as a child, she never took an easy shot when a hard one was available. She often playfully worked tricks into her hunting — spinning in a circle while shooting a rising quail, or taking a hop and a skip in the midst of a wing shot.

Buffalo Bill Historical Center, Cody, Wyoming

The star attraction of Buffalo Bill's Wild West Show, "Little Missie" missed only four performances in 17 years. Ironically, she had never been west of the Mississippi River until she was 30 years old.

Buffalo Bill Historical Center, Cody, Wyoming

Annie Oakley was the toast of royalty when the Wild West Show made its first European tour.

At the age of 15, Annie Oakley's fame spread beyond Darke County. Word reached Frenchy Lamotte that a well-known exhibition shot named Frank Butler was shooting in Cincinnati — and he welcomed all challenges. Frenchy felt that Annie could beat the champion. Together with Annie's family he scraped up $50 for a side bet, and they traveled to Cincinnati.

No doubt, Butler was surprised to see that the local champion was a dark-haired girl half his own age. No doubt he was more surprised when she matched him shot for shot in a pigeon shoot at a prestigious German gun club. When the 25th bird was released, Butler fired and missed. Annie killed her bird for a perfect score. One year later, they were married.

For the next five years the team of "Butler and Oakley" toured the Midwest, putting on shooting exhibitions in vaudeville shows. During this time, Annie developed her shooting skills and grew into a strikingly beautiful woman. Their big break came when the Sells Brothers Circus, one of the largest at that time, offered them a 40-week contract. After seeing that she was a far better shot than he could ever be, Frank quit shooting and became Annie's manager and trainer.

Circus life didn't appeal to Butler and Oakley, but in 1885, at the World Industrial and Cotton Exposition in New Orleans, they were introduced to the show that would make them famous. Camped outside of town was another struggling show, Buffalo Bill's Rocky Mountain and Prairie Exhibition, mired in mud and financial troubles. Buffalo Bill showed little interest in hiring another shooting act. Until he saw Annie shoot.

For the next 17 years, Annie Oakley would be the star performer of the Buffalo Bill Show, often upstaging the "Great Scout" himself. She would miss only four performances while traveling 170,000 miles.

The Wild West Show was a blend of fact and fancy, giving eastern and European audiences the mixture of cowboys and Indians that they craved. The legendary Sitting Bull, whose Sioux Indians had destroyed Custer's Seventh Cavalry a few years earlier, traveled with the show for five seasons. Playing himself, he would inevitably be showered with catcalls and insults at the conclusion of the "Battle of the Little Bighorn." For added effect, when the show played in Madison Square Garden in New York City the widow of Custer would often appear in the balcony — dabbing at her eyes with a handkerchief. In Canada, however, the tables were turned. Sitting Bull was hailed as a hero, and the massacre of Custer's cavalry concluded with standing ovations. Disturbed by echoes of "54-40 or fight," Canadians were edgy about their aggressive neighbors to the south, and remembered that Sitting Bull had sought protection and lived peacefully in western Canada for several years after the infamous battle.

Buffalo Bill himself was a man of contradictions. It is true that he was a cavalry scout, rode with the Pony Express, and killed over 4,000 buffalo in 17 months while market hunting for the Union Pacific Railroad in Nebraska. He was not, however, responsible for halting Indian wars single-handedly — as dime novelists and the very effective publicity department of the Wild West show claimed. In later years, Buffalo Bill almost seemed to believe some of these tales. He died a pathetic figure, mired in financial difficulties, family problems and deepening alcoholism.

N.C. Archives and History

The wealthy residents of Pinehurst were not the only ones to benefit from Annie Oakley's expert instruction on the use of firearms. During World War I, she traveled throughout the country giving rifle demonstrations to American troops and raising money for the Red Cross.

N.C. Archives and History

For eight years, the Carolina Hotel in Pinehurst was the winter home for Annie Oakley and her husband Frank Butler who was also an excellent shot.

There were two things in the Buffalo Bill show that were absolutely real. The first was the riding. Buffalo Bill had assembled the best cowboys, ropers, and trick riders available. Crowds inevitably thrilled to see a wild longhorn cut out of a herd, roped, and thrown. Annie's shooting was also real. Consider what the London, Ontario, Free Press said about her in September, 1885:

"The largest share of applause was bestowed on Annie Oakley, a young girl whose proficiency with rifle and shotgun seems almost miraculous."

Typically, her performance was very low key. She would start by throwing a glass ball in the air, and shatter it with a single shot from a .22 rifle (Buffalo Bill often did the same from horseback, using shells loaded with bird shot). Then, her husband would throw two glass balls in the air, and while cartwheeling over a gun table, she would seize a rifle and shatter both. Later, she would shatter five glass balls in the air at once.

Then, in a supreme act of faith, husband Frank would hold a small silver disc over his head. Nonchalantly, Annie would sight in the silvery reflection of a polished bowie knife while aiming over her shoulder, and shoot the disc out of Frank's fingers. Western movie buffs no doubt remember a scene in *Butch Cassidy and the Sundance Kid* where Sundance, after facing down a small-time gunfighter in a dingy saloon, sent the man's pistol skittering across the floor with a blaze of shots. Annie could do the same — with a golf ball as a target. She generally finished her act riding behind a cowboy who was swinging a set of targets on a rope, which she would shatter with her six-shooter while riding hell for leather. Her show drew raves.

Probably the highlight of Annie Oakley's career occurred when the Wild West show made its first tour of Europe in 1887. The show created a sensation in London, and the cowboys, Indians and Buffalo Bill were the toast of the town. European royalty was generally very fond of hunting and shooting, and impressed by Annie's exceptional ability. A sticky diplomatic situation ensued when the Grand Duke Michael of Russia, an avid sportsman, challenged Annie to a shooting match. American diplomats wished to halt the contest after talking to members of the Wild West show because they had little doubt about the outcome. Annie shot 50 targets in trap with the Grand Duke, who was soundly defeated. He took it well. On another occasion in Germany, with a single rifle shot she snuffed a cigarette out of the mouth of young Kaiser Wilhelm. Years later while giving shooting demonstrations to American troops in World War I, she would smile and say she regretted her aim had been so sharp.

Without a doubt, Annie Oakley was the most popular member of the Wild West show. Known to all as "Little Missie," the nickname Buffalo Bill gave her, Annie Oakley was as fine a person as she was a shooter. Performers, from the lofty Buffalo Bill to the rough cowboys who handled the stock, remembered her as being one of the kindest people they had ever known. She was given hundreds of silver and gold medals and trophies for her shooting. Not one exists today — she had them all melted down, and the proceeds were given to charities.

The formidable Sitting Bull, who was a very kind man, even adopted Annie as his daughter. The publicity department of the Wild West show made much of this at the time, and although the show had more than its share of hype, this was not an idle honor. Sitting Bull had adopted only three other people into his Indian family — an orphaned child of a neighboring Indian tribe wiped out by the Sioux in raids, an Oblate missionary who came among the Plains Indians in the 1860s, and a captured French mail carrier who repaid Sitting Bull for his kindness 10 years later by leading the cavalry as a scout on a raid against the Sioux on the Powder River in Wyoming. Sitting Bull's nickname for his adopted daughter, "Wan-tan-yeya Ciscila" or "Little Sure Shot," lives to this day.

Eventually, Buffalo Bill grew old and his Wild West show declined in popularity. The end of the show for Annie Oakley came in North Carolina. On October 28, 1901, the Wild West show played in Charlotte for 12,000 people. Only one more show — in Danville, Virginia — was left in the season. Then, the cast would separate for the winter. Annie and Frank would go to their colonial farm house in rural New Jersey, the Sioux Indians would return to the Pine Ridge Indian Reservation in Nebraska and South Dakota, and Buffalo Bill would return to his beloved "Scout's Rest" Ranch in North Platte, Nebraska.

Freight number 75 left Greensboro that night, but missed a telegraph order. The Buffalo Bill show train was pounding north at full throttle. The two met outside of Lexington in a terrible crash.

Miraculously, no one was killed, although over 100 horses, cattle and buffalo died in the crash. Annie Oakley, however, was seriously injured, and was paralyzed on her left side. Months would pass before she could walk, but eventually she regained her shooting skills. Never again, however, would Little Missie do a cartwheel over her gun table, seize a rifle, and shatter glass balls in the air while thousands roared.

The next few years were difficult for Annie and Frank. They traveled the country teaching shooting and performing exhibitions. The permanent berth they found at Pinehurst was a welcome relief. Both were active in the affairs of the town, and in the summers they taught trap-shooting at the Wentworth Hotel in Newcastle, New Hampshire — a grand resort which was also owned by the owner of the Carolina Hotel in Pinehurst.

This idyllic life came to an end in 1922, when Annie was injured on a quail hunting trip in Florida. An automobile

overturned, and her leg was shattered. In ill health, she returned to Ohio — wishing to be near relatives, and the scenes of her youth. Not long before she died in 1926 — and her husband Frank would die only a few weeks later — her good friend Will Rogers wrote this touching tribute to her in his nationally syndicated column:

"This is a good story about a little woman that all the older generations will remember. She was the reigning sensation of America and Europe during the heyday of Buffalo Bill's Wild West show. She was their star. Her picture was on more billboards than a modern Gloria Swanson. It was Annie Oakley, the greatest woman rifle shot the world has ever produced. Nobody took her place. There was only one. She is bedridden from an automobile accident a few years ago. She for years taught the fashionable people at Pinehurst, N.C., to shoot. America is worshipping at the feet of Raquel Meller, the Spanish lady. Europe talked the same of Annie Oakley in her day. I want you to write her, all you who remember her, and go see her. Her address is 706 Lexington Avenue, Dayton, Ohio. She will be a lesson to you. She is a greater character than she was a rifle shot. Circuses have produced the cleanest living class of people in America today, and Annie Oakley's name, her lovable traits, her thoughtful consideration of others, will live as a mark for any woman to shoot at."

Buffalo Bill Historical Center, Cody Wyoming

In later years, Annie Oakley devoted much of her time to answering letters received from thousands of fans the world over.

Few mementos of Annie Oakley's life exist. Her medals and trophies were melted down and her costumes and other memorabilia seem to have disappeared over the years. There are, however, several places featuring small exhibits.

The Tufts Archives Wing of the Given Memorial Library in the center of Pinehurst has a few items from Annie Oakley's years there. An exhibit dealing with the gun club at the Carolina Hotel has several black and white photographs of Annie and her husband teaching trap shooting. A few of the targets that she shot with a rifle are on display, and clippings from old newspapers are available. The archives are open from 9:30 until 5 p.m., Monday through Friday.

The Garst Museum in Greenville, Ohio — run by the Darke County Historical Society — also has a small collection of Annie's mementos. The museum is located in her home town. If you're out West, you may want to visit the Buffalo Bill Historical Center in Cody, Wyoming. Several of Annie Oakley's guns and other personal effects are on display.

All told, there's not a lot left to remind us of the woman whose name is still widely recognized, a woman whose qualities went far beyond her skill with firearms.

Buffalo Bill Historical Center, Cody, Wyoming

The North Carolina Sandhills were a favorite quail-hunting spot for Annie and her husband. An automobile accident on a quail-hunting trip in Florida ended her shooting, and she became a semi-invalid.

Sixty-Five Years On The Cape Fear

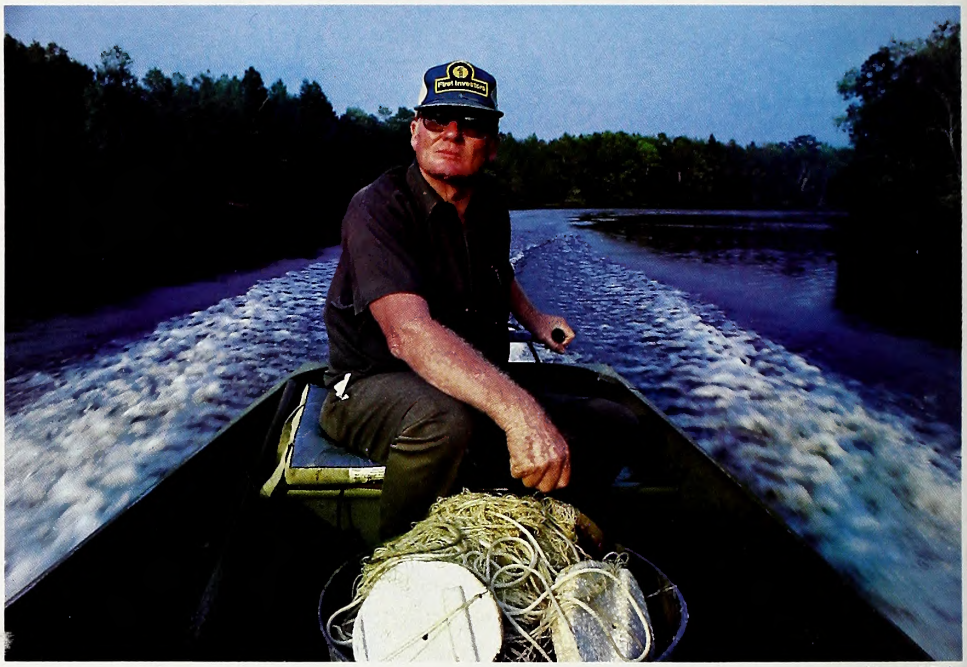
The natural rhythm of the lower Cape Fear becomes part of any life spent in this still-wild country.

By Crawford Marshall as told to Lawrence S. Earley and Ted Dossett

From its headwaters above Greensboro, the Cape Fear River pushes insistently southeast for 180 miles before it mingles with the salt water of the Atlantic. But human history begins at the sea and pushes just as insistently inland, up the avenues of rivers and into the mountain fastnesses. The Cape Fear was one of the main avenues of North Carolina settlement. Beginning in the 17th century, Englishmen, Irishmen, Scots, Germans, French and Swiss — rich and poor — fought the swift water upriver. They built plantations on the high banks, found mile after mile of virgin longleaf pine amid the sparkling white sand, and farmed the fertile land in the upper reaches. On the river's broad back these settlers boated the foodstuffs and naval stores down to the great port of Wilmington.

About 10 miles northwest of Wilmington, the Black River empties its slow-moving dark water into the faster Cape Fear. The land is as heavily forested here as it was three centuries ago, and logging is a traditional occupation of the people. Crawford Marshall has been a logger nearly all his life. His house is a stone's throw from the Black River. He's rafted thousands of cypress logs to Wilmington, chased moccasins from his machines, caught the glint of ancient Indian pottery in the riverine fields. He's netted giant sturgeon in small boats on the Black River. But the virgin longleaf pines that he cut in his youth have yielded to faster-growing loblolly pines, and some of his favorite haunts are changed today.

One summer's day, while a driving rainstorm nearly flooded the road, Crawford Marshall took us to his cabin on the Cape Fear Thoroughfare, a cut between the Black and Cape Fear rivers. There, as the rain pelted his tin roof, he talked to us about his life.



Lawrence S. Earley

After an afternoon fishing for sturgeon along the Black River, Crawford Marshall returns to his camp near the Cape Fear Thoroughfare.

Marshall has logged the historic Cape Fear since the 1930s.

I was born in 1917. I've lived in this area all my life. I've done extensive traveling in the woods in this area, and practically all over the State. But the coastal area is the one I'm most familiar with. In the late '20s until about 1933 we had a depression that put everybody into the woods and we learned more then, I think, than at any other time, in school or anywhere. It was a struggle for survival.

You didn't have money to buy fishing lines; you didn't have money to buy anything with. We knew where these creeks were at and we'd just go in there and catch enough fish and we'd go around and give each one in the community enough fish to last them. We'd probably do that thing twice, or three times a week, see. And the people in the community learned to appreciate you.

If we had some shells, the whole bunch would go. We didn't try to kill to destroy. We just killed what we could give away.

We went to logging in the late '30s, and have been logging since then. There were plywood plants in Wilmington and we would go in on a particular island that's got 2,700 acres on it, and we would take hooks and put poles down and roll those logs out — 8 foot long — to the riverbank and float them to Wilmington. We were getting $5 per thousand at that time for those logs, delivered in Wilmington. Well, $5 didn't seem much but it kept our stomachs from sticking to our backbones. I'm talking about tupelo gum trees. They were making plywood out of gum trees. They're still making plywood out of tupelo. Sweet gum or other gums at that time were used also up until the middle '60s.

When we first started out we didn't have enough money to buy machinery with.

We'd go in and belt the cypress timber. When I say belt it, I'm talking about cutting through the sap into the edge of the heart and letting it die, and then cutting it down. And when a freshet come, we'd have the top cut out of the tree and we'd float the log out to the river and then to Wilmington.

How did we float it down? You rafted it. When I first started you bored holes in the ends of logs — where you wanted a 16 foot log, you cut it 17 foot 6 inches so that when you bored those holes you wouldn't be in the 16-foot length. You pegged the logs together and made a raft out of them and floated to Wilmington with the tide. On the front of the raft you'd have a 35 foot oar, cut right out of a log. There'd be two big logs on the front of the raft that the oar would fit in between. Three men would pull the oar so that the raft didn't go head first into a bend. It was like a rudder. The oar on the rear of the raft was used to stop it and pull it into shore. The tide goes out in this area seven hours, rises five. You would tie up on the incoming tide, but you had to tie up before the tide quit running otherwise you'd be floating back. You never let the front end of the raft hit the bank, because if it did it would turn you around and tear you up.

The rafts had five 16-foot columns, and a turn column that would give the raft some flexibility around the turns. It would take about four tides to get from here to Wilmington, or about a day and a half. Sometimes the east wind would blow up river and stop you dead in the river. The raft wouldn't travel against a wind. You'd have to tie up for a tide or two. The longest I've spent on a raft was five days.

We barge logs now and I go to Fayetteville often to get logs, with a tug and barge. We put 'em on a barge and the tug pushes the barge.

When you're cutting logs in a swamp the snake will stay ahead of you a quarter of a mile. But you still have some. We had what we called "steam skidders" which were machines fired by a wood-burning boiler that winched logs out of the swamp. In the morning you'd have to go in at 4 o'clock and fire your skidders up and be ready to go and in the winter time, of course, you just didn't have no snakes but in the summer time that skidder would get cooled down and sometime in that firebox it would be cooled down enough that there'd be moccasins in the firebox next morning when you're building a fire in there. And you were right in the water when you were building a fire. I've seen coons or anything to go in that firebox. Why they go in there I don't know. You always left your firebox doors open. But you start moving around in the daytime and your snakes would move out.

I think the most snakes that I ever run across was on Roan's Island. It is a deep swamp and water usually stays in there about 3 feet deep. And in extremely dry times when the water gets low — this is prior to 1970 — the fish would get out in these holes — tremendous volumes of minnows and little fish — and these cottonmouths would go to these holes and follow the water back as it dried up to feed on those fish. And that's when you would find a tremendous volume of snakes concentrated in one area. And another case would be if you had a bunch of herons that are nesting over a pond — sometimes you'll have 300 to 400 nests up in the trees. As they bring the fish in to feed the young ones they drop a lot of it down and you can look for a concentration of moccasins under these areas.

This is the Cape Fear Thoroughfare. It's the cutthrough from the Cape Fear to the Black River. We're on a little peninsula right here. There's 100 acres right here.

The Black River and the Cape Fear River are different rivers. The Black River is a slow-flowing, acid-water river. It's a black water river and your timber is not as good on the Black River as it is on the Cape Fear.

You just don't get the growth on the Black River because the topsoil that comes down is not as good. You don't get no tree this high. I can take you down there and show you — the difference between the trees down there and the trees here.

We know that any time you get this topsoil you're getting all the Piedmont's topsoil down here. But I'm saying that it's destroying the fish, because it's destroying our habitat for the fish. The silt is filling in. The river is filling up, that's what it amounts to. We've always had siltation on the Cape Fear, don't get me wrong, but just a little ol' skim of silt would come down here on a freshet and at the end of three weeks a piece of that soil, like a third of a shoe sole, would just curl up. And it's just as thin like it's been strained through something.

But we're not talking about that kind of siltation. We're talking about after a freshet a deposit of soil something like 3 inches deep. Out in the swamps. It's just started to happen on the Black River. In the last 10 years it's beginning to silt in bad.

You used to come down the creeks or the river in here, and you had water in the creeks, deep water. You could see your fish beds. Now you begin to see the beds drop off. And the ones that were there, the fish had to keep swimming and running to keep the silt out, and to me there's no way for them to keep the silt out.

Along about '70 it started. You would have a freshet that would cover all the basin and you would have pockets where the freshet would leave water in there. You would see that water backing up day by day as it evaporated or soaked in the ground, and you'd see thousands of little fish in these puddles. About six or seven years ago you just don't see any more of those small fish in these holes. You just don't see 'em. There's got to be a reason.

We do a lot of sturgeon fishing along the Black River. Before the '50s you could set a net along this Black River or the Cape Fear Thoroughfare and put a bell on it. When it rung that meant that the sturgeon was in there. And it would almost keep you busy out there working them. Since then we have used drift nets, and we have caught a considerable number of them on and off each year. In your shad nets, in the early spring, you catch an occasional sturgeon, but your biggest catch is the little sturgeon. You'll catch one maybe a foot and a half long and how long it takes them to grow up I have no idea. The biggest sturgeon that I have ever caught was 484 pounds. That would be about 10 feet long. A good-sized sturgeon has a tremendous amount of oil in its head and the hides — and people would take them and boil the hides and the heads, skim the grease off the top of it and people used it to keep flies and stuff off of their livestock and the mules that worked in the woods.

When you take your sturgeon out of the net, you never kill 'em. You'd put a rope around their tails and tie 'em to a bush or a stake up on the bank. Sometimes you'd have 10 or 12 staked out until you could find a sale for 'em. They'd stay alive for about a week. The refrigeration's not as good down here. If you keep him alive he's all right. If someone wants 'em, you just take 'em right out and carry them over to the market where you can have them refrigerated. Local folks used to buy sturgeon, and they did have a market in Wilmington that used to buy a little bit. At the present time, I understand, there's a market in Georgetown that buys 'em. I have been told that you can sell this roe. That's caviar.

About halfway down the Black River from this point here, just above this upper camp that we have, which is just about three miles, I've got picked out the spawning area for the sturgeon in this area of the

Black River. You just see more of 'em jump here than at any other point in the river. The ones that can jump will clear the water, and them big ones don't get out over half way. He'll shoot up so far and when he comes down it sounds like someone's throwed a log in the river. But we get a change of a tide and that's when they really jump. When he goes straight up that way, he shakes himself and falls right back down where he came out. They'll be a string of bubbles there. Some of them big ones can't even get out of the water. He'll just get up about a third out of the water.

We love to sturgeon fish at night. Your better time is at night. That was the reason they had the bells on the net; they'd set 'em at night, see, and they'd go to the hill and when that bell rung they didn't have to stay out there with that net.

My daddy used to let hogs run wild in these woods — when I say wild I don't mean that they were wild, but they would put 'em down here. Well a bear would come through and kill one occasionally, and they would never eat any of it, just kill it, the bear would. And it just got me curious to know why it would kill it and not eat it.

So I started feeding 'em, putting out corn for 'em in places. I been feeding 'em for about eight years now. I've got a place just beyond the head of that field right up there. I have a tower there to look at 'em. They come to the corn just like the hogs come to their feed place. After I watched these bear playing on these corn piles I found out that they probably just slapped the hog too hard and killed him. He can't stand something to move without getting in the middle of it, a bear can't. An old sow will bring her two cubs to the corn pile. When you see the head come out of the bay, the nose will be the first thing and they'll stand there maybe three minutes. And then they'll get their head out. And when they're pretty sure of what's around they'll come on out and go to that corn pile. And the first thing they'll do is set right down in the corn pile. They'll turn up new corn. And when that mama sets down, them cubs are just messing with her all the time. They're just aggravating her. She'll catch 'em and sometimes she'll knock 'em 10 or 12 feet over yonder and they'll just roll and come back. A cub will do just about anything in this world. They'll go up a tree and turn wrong side up, hang off a limb; they'll go to fighting, they'll knock one another. They just can't stand it. I find it's just a pleasure to look at 'em. I have just as big a time sitting up there laughing.

We have got them now where they'll put their feet up on the stand and look up at you. This is the smaller bear I'm talking about. People say they will hurt you. Well, you know that if you were to offer them some feed he'd come up there and hurt you eventually. The most that I've had on any one pile has been nine. They come in late in the evening. One day there were seven raccoon on this pile of corn, 21 deer (there wasn't a buck deer in the bunch; the buck, he's a smart gentleman), and three bear feeding on that corn pile at one time in just as good a harmony as you've ever seen. I don't know how many squirrels were around there. A lot of people say that a bear just won't let a deer stay where it's at, see. But every now and then the deer would get in his way, and he'd stand up and the deer would walk away.

It's my opinion that a bear, he knows if you're treating him good, because I've had other people who have tried to bait 'em and shoot 'em, you know. And they can't keep the bears. We move the bear anywhere we want to. You can move 'em 15 miles if you take time, but you can't move 'em more than a mile and a half at a time. When the corn first starts you can break it and say if you're feeding him in this particular area and you move about a mile and a half down here and you know about what areas they travel — they'll start feeding. Just as soon as they start feeding and eating that pile up, you can move him on down. But you got to move him to habitat that he wants. And you got to know what kind of a habitat it is. They'll go in real wet places, but if you want to feed 'em it's a dense place — just as thick a pocosin bay as you can get, with a little sand ridge on the edge of it. You can go in there and they will cut down beds and sometime they'll be 8 feet and then they go up under that brush, and that's where they have the young ones at and what little hibernation they do in this area.

There was an old gentleman that was a forester and he had a great tale that he told about how the bears would take the corn in their arms and carry it over the side of the fence. And one day I was in a barber shop in Atkinson and I was young and of course he was old. But he was telling this story . . . he said the bear would drop an ear and he'd get disgusted and throw down the whole bunch and go back and get another armful. So this barber said, "Mr. Johnny, so and so up there in the Rowan community had one up there that was doing the same thing. And he said he was carrying it out and he'd go out and carry an armful and come back. Said he got curious and went out there to see what was happening. And he said he had an old pork hog out there and that the bear was carrying the corn out there to the stump hole where the hog was and said he was feeding the hog." I never did hear old man Johnny tell that tale again!

Now we have bear that are eating corn in the field here and I can show you it today. Well, they'll take the whole stalk, corn and all, three or four stalks of it and sometimes they'll carry it out of that field out there. You can tell a bear eating from a coon eating. Ninety percent of your corn that's taken in the field and carried outside is from coons pulling that stuff down. He's regular, just going and coming. But a bear, when he sets down in a corn field, don't look for him right around the edge of that corn field. You go out in that corn field about 100 yards or so and you're going to find he's got a acre or two tore down where he goes in there and eats. And he's got a path going back out of there.

I had this field right here in corn, and the bear got right in the middle of that field and I had four that eat that whole field up. But they started in the middle and they eat out and when they finished up they were on the outside getting the corn. He don't stay along the edge of the field and eat the corn. When he goes in that field and gathers up two or three stalks, I think he's gathered them up when he's going out.

I've got a four-year-old grandson, and he can tell you a lot about deer and bear today. I carry him up into stands and let him look at the wildlife. But how many thousand young ones across this State don't even know what the word deer or bear even mean unless they see it in a book.

I don't kill anything unless I'm going to eat it. And when I was a kid I did. I can understand why children will do it today. I'm certainly not down on them. I would try to lead 'em a different course. I have just growed up to love wildlife and respect it. And I know that there's not going to be any left here for my grandchildren's children to see if we don't do something about it.

Carolina Profile *is a periodic feature in* Wildlife in North Carolina. *In these interviews, men and women reflect on their outdoor experiences and on what the land and its resources mean to them.*

Wildlife Endowment Fund Hits $1 Million

Goldsboro businessman honored by Governor James B. Hunt Jr.

By Mark Taylor

"The contributions made by the sportsmen of North Carolina to the Wildlife Endowment Fund will ensure that future generations of North Carolinians enjoy the rich wildlife heritage that we know today — the sight of flights of ducks coming into a coastal sound, a wild trout taking a dry fly on a mountain stream, or a covey of quail rising from a farmer's field in the Piedmont."

These were the words of North Carolina Governor James B. Hunt Jr. upon presenting S. Dillon Wooten of Goldsboro a plaque in recognition of his having purchased the lifetime sportsman's license which boosted the Wildlife Endowment Fund over the $1 million mark.

The Wildlife Endowment Fund is a unique program that will ensure a rich future for wildlife in North Carolina. The fund is supported by the sale of lifetime hunting and fishing licenses, lifetime sportsman's licenses, lifetime subscriptions to *Wildlife In North Carolina* magazine, and tax-deductible contributions. Only the annual interest from the fund is spent on wildlife conservation, and as the fund grows over the years it will play an increasingly important role in funding the State's wildlife programs.

"The development of the Wildlife Endowment Fund is truly an innovative way of financing worthy programs in tough economic times," said Hunt at the presentation on December 6. "I congratulate the members of the Wildlife Commission for the development of this unique program, and commend them for the hard work that they have devoted to promoting the program."

When Wooten purchased his lifetime sportsman's license in October, he had no idea that it would ultimately lead to his meeting the Governor. However, he was pleased to learn that his contribution to wildlife conservation had pushed the fund over the landmark figure of $1 million.

The Goldsboro native is one of the principals in Wooten Oil Company and Coastal Transport, Inc. He is married, and has three daughters. He says that he enjoys hunting and fishing — especially duck hunting and saltwater sport fishing — but doesn't go as often as he'd like.

Governor James B. Hunt Jr. presents plaque to S. Dillon Wooten.

"I was honored to meet Governor Hunt and appreciated the plaque," he said. "There are several good reasons to buy a lifetime license. From a selfish standpoint, I appreciate the convenience of not having to repurchase a hunting and fishing license every year. This is a real blessing if you have a busy schedule. Since I fish and hunt often enough to justify buying a license, I figured that I might as well buy a lifetime license so I'd always have one handy. Another excellent reason for buying a lifetime license is that this program will benefit wildlife in the future — the sportsman not only saves money in the long run, but has the satisfaction of knowing that he is making a contribution to wildlife that will benefit future generations. It's a good feeling that you'll be helping wildlife after you're gone.

Officials with the N.C. Wildlife Resources Commission are pleased with the growth of the Wildlife Endowment Fund. As of November 30, there was over $1,006,000 in the fund, and over 3,500 lifetime sportsman's and lifetime hunting and fishing licenses had been sold.

"I am very pleased with the growth of the Wildlife Endowment Fund since its inception," said Vernon Bevill, executive director of the Wildlife Commission. "In the hard economic times that our State and nation have been through in the past year, I feel it is commendable that over 3,500 people have purchased lifetime sportsman's licenses, and I thank all of these people for their support. I believe that many other North Carolinians will purchase these licenses as they learn about the program and the tremendous benefits it has to offer sportsmen and wildlife in North Carolina.

Passing the $1 million mark also lends additional credibility to the Wildlife Endowment Fund, and there is tremendous potential for much more growth. This fund is already benefiting wildlife. We expect to use about $250,000 in interest earnings from the Wildlife Endowment Fund to help finance wildlife programs through the next biennium."

"When we honor Mr. Wooten for boosting the Wildlife Endowment Fund over the $1 million mark, we also honor the other 3,500-plus sportsmen who have contributed to this fund through the purchase of a lifetime license," said Governor Hunt at the presentation. "I'm proud that North Carolinians care deeply about our natural resources and wildlife and show their concern through the support of this fund. Because of the Wildlife Endowment Fund, our wildlife heritage will benefit in the years to come. I urge all citizens of North Carolina to support this fund through tax-deductible donations or through the purchases of lifetime hunting and fishing licenses, or lifetime subscriptions to *Wildlife In North Carolina*. I certainly treasure my lifetime sportsman's license."

Shorter Seasons Not The Answer

Writen and Edited by Mark Taylor

"Ask A Biologist" is a series of articles on wildlife management that appears periodically in *Wildlife In North Carolina.* The author is Carl Betsill, a Wildlife Commission biologist who specializes in the management of small game and urban wildlife.

Luther Partin

Hunting Doesn't Hurt: *Shorter hunting seasons have no effect on the numbers of rabbits and other small game animals found the following spring. In fact, 70 to 80 percent of the animals in a small-game population die every year — whether they are hunted or not — and hunting merely substitutes for other forms of mortality.*

Question: I enjoy small-game hunting, but don't seem to do as well as I used to. The game doesn't seem as plentiful, but the hunting seasons change little. Would shorter hunting seasons boost small-game populations?

Many small-game hunters who have noted declining hunting success ask this question. They feel that shorter hunting seasons would allow more animals to survive until the breeding seasons, which would result in more plentiful game the following fall. This approach works with some of the longer-lived species — like waterfowl, raccoons or deer. However, it doesn't work with small game because of the high turnover rate in the populations.

Few people realize that 70 to 80 percent of the animals in a small-game population will die and be replaced through reproduction each year. This turnover occurs whether the animals are hunted or not. In fact, study after study shows that legal hunting has no effect on the numbers of small-game animals the following fall.

This is hard to swallow until you understand the concept of "compensatory mortality." This term simply means that if one thing doesn't kill the critter, another will. For example, if hunting increases death from disease will decrease because animals will have less contact among themselves — which slows the spread of the disease. Of course, the reverse is also true. If disease increases, hunting success will decline. Regardless of the situation, though, 70 to 80 animals out of 100 will die each year. The only difference is how they die. Other factors which take part in this "give and take" relationship include the availability of food and cover and predators. In fact, the hunter is just another predator. All of these factors play a key role in keeping wildlife populations in balance.

To be more specific, many rabbit hunters feel that hunting seasons should not run through February because pregnant females are killed. However, the long-term effect on the rabbit population is the same regardless of when the animals are killed. Although many rabbits are carrying young in February, very few have dropped their litters this early. So, this late-season hunting has little effect on the reproductive potential of the rabbit population because of high natural mortality in young rabbits. February hunting also poses no problems from a humane standpoint because hunters are not leaving young, orphaned rabbits to fend for themselves.

If shortening seasons isn't the answer to improving small-game hunting, what is? Wildlife biologists have found that habitat improvement is the most effective way to boost small-game numbers. All wildlife species need food, water, escape cover and reproductive areas. However, the needs of species differ — and meeting these needs is not always easy. If any of the key factors are missing or in short supply, the potential for population growth is limited.

Fortunately, the Wildlife Commission has wildlife biologists stationed across the state with the technical expertise and practical experience to meet these needs. These biologists are happy to work with landowners to improve wildlife habitat. If you need help, simply contact your local wildlife enforcement officer or call the Wildlife Commission's 24-hour toll-free Wildlife Watch hotline at 1-800-662-7137 for the name and address of the wildlife biologist in your area. This assistance is provided free of charge, and is made possible by hunting and fishing license fees.

Suzie Finds A Home

Suzie the Bear is alive and well and living at the North Carolina Museum of Life and Science in Durham. And, zoo officials report that she has some new friends — the six other black bears that share her natural-habitat enclosure, which includes a pool, ledges and vegetation.

Life wasn't always pleasant for Suzie. Until her rescue in mid-June from a bear-baiting ring on the Cherokee Indian Reservation in western North Carolina, Suzie spent her days chained between two trees — protecting herself from the attacks of two to four dogs. Suzie was being used by insensitive and unscrupulous dog owners to train bear dogs. Her owner was collecting $3 per dog for the opportunity to train the animals on a live bear (Editor's Note: This is not the customary method of training bear dogs, and legitimate bear hunters were angered by the abuse of Suzie. Also, this sort of abuse is illegal). Ultimately, after Suzie was rescued by wildlife enforcement officers of the N.C. Wildlife Resources Commission and U.S. Marshall David Griffith, Suzie was moved to the western North Carolina Nature Center.

Since Suzie was permanently injured — she suffers from irreversible nerve and ligament damage in the hind legs — it was assumed she would have to be put to sleep. However, Griffith took a strong interest in her (naming her Suzie after his daughter) and found her a home at the North Carolina Museum of Life and Science in Durham where treatment of her wounds began.

First on the agenda was some dental work. Dr. John Bianco and Dr. Gene Rodifer worked on the pitiful remnants of the bear's teeth at cost, while a Hillsborough woman paid the dental bills. In addition, the KIND Club of Durham — a youth division of the Humane Society which is affiliated with the museum — contributed $20 a month to feed Suzie.

At the museum, Suzie received further attention from curators Lynn Moredock and John Roxby, and she soon captured the hearts of both the museum staff and visitors. At first, she was kept in a small, isolated pen adjacent to the main bear compound while her wounds healed. This also gave her a chance to adjust to her new home, and allowed the other bears to become accustomed to her presence.

In early September, Suzie was moved into the main compound. The first few days were tense — everyone wondered whether Suzie would be accepted by the other bears. Everything went smoothly, however, and Suzie stepped right in and established a place for herself among her peers. Despite her missing teeth, she chows down with the other bruins — consuming a healthy share of "omnivore chow", the special mix that the bears are fed. In fact, she is usually the first bear to eat and has claimed a prime spot for lounging — two marks of prime status in a bruin's world.

Suzie is also looking well these days. She has gained weight and grown a fine, thick winter coat. Visitors to the compound would hardly guess at her tortured past. We can only hope that other animals suffering similar abuse meet as happy an end.

— Rosalyn Borofsky
N.C. Museum of Life and Science Intern

Jim Thornton, Durham Sun

Peace At Last: *Suzie the Bear is recovering nicely at her new home at the North Carolina Museum of Life and Science in Durham after being rescued from a bear-baiting ring in western North Carolina.*

Cooking Deer

Take It Slow

The popularity of crock pots gives sportsmen-chefs many additional ways to prepare wild game. Slow cookers transform cuts of meat that are tough into tender dishes that are often mistaken for choice beef. A universal favorite is venison stew or roast which is prepared in much the same way as beef — but the secret is *slow* cooking!

Ingredients:

2 pounds venison stew or roast
1/2 cup flour
1-1/2 teaspoons salt
1/2 teaspoon pepper
1-1/2 cups beef broth
1 teaspoon Worcestershire sauce
1 clove garlic
1 bay leaf
1 teaspoon paprika
4 carrots, sliced
3 potatoes, diced
2 onions, chopped
1 stalk of celery, sliced

Place meat in crock pot. Mix flour, salt and pepper, and pour over meat; stir to coat meat with flour. Add remaining ingredients, and stir to mix well. Cover and cook on low heat for 10 to 12 hours. Stir thoroughly before serving.

It's okay to sneak a whiff during cooking. In fact, the aroma is so good we doubt you could resist.

— Terry Shankle

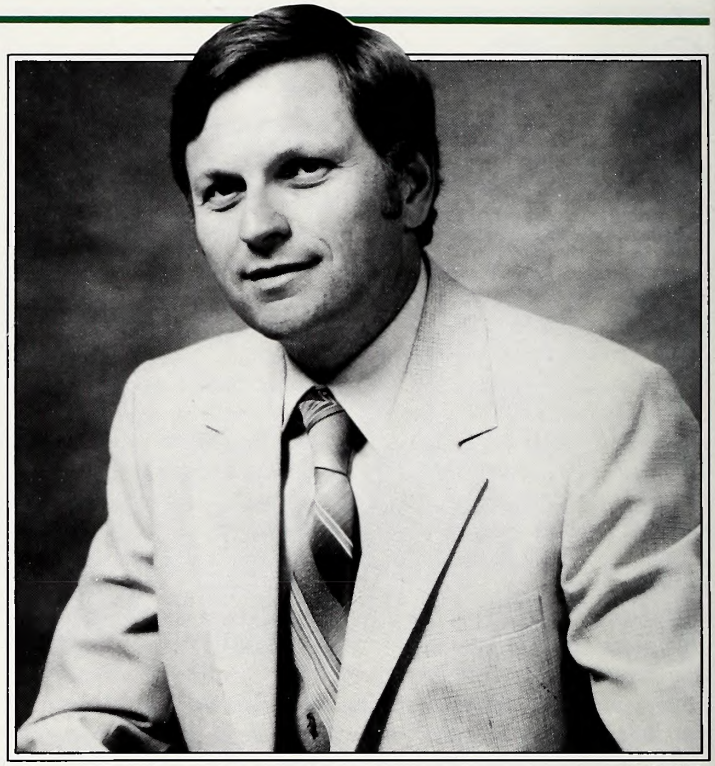
Vernon Bevill Honored

Vernon Bevill, executive director of the Wildlife Commission, recently received the 1982 Penn's Woods award for outstanding accomplishments in the field of wild turkey management. Penn's Woods is a major manufacturer of turkey calls and equipment.

"I am honored to receive this award," said Bevill. "The restoration of the wild turkey is one of the great wildlife success stories of our time. With the strong support of concerned sportsmen, wild turkey populations should continue to expand in the immediate future."

Bevill has served as executive director of the Wildlife Commission since June of 1980. Before coming to North Carolina, Bevill served as head of the wild turkey program for the South Carolina Wildlife and Marine Resources Department, and the award recognizes this previous work. Under his leadership, statewide turkey population surveys and breeding behavior studies were conducted. Wild turkey habitat was identified and evaluated and subsequently stocked with turkeys. This project is playing a key role in the expansion of wild turkey populations, and the overall research and management efforts developed under the turkey program have enabled South Carolina to improve turkey hunting opportunities — including initiation of a fall either-sex season which began in 1981 in some areas.

Bevill is a native of Mansfield, Louisiana, and received a B.S. degree in Wildlife Conservation and Management from Louisiana Tech University in 1968. In 1970, he received an M.S. degree in Wildlife Science from New Mexico State University. He lives in Raleigh, is married, and has three sons.



Ken Taylor

High Honors: *Vernon Bevill, executive director of the Wildlife Commission, recently received the prestigious Penn's Woods award for outstanding accomplishments in wild turkey management.*

Good News From Washington

Good environmental news from Washington is rare these days, but the recent passage of the Coastal Barrier Resources Act is a sterling exception. This landmark legislation prohibits federal expenditures which encourage development on barrier islands and beaches. Over 600 miles of beach in 15 Atlantic and Gulf Coast states is included in the legislation.

In these designated areas, federal flood insurance will not be issued after July 1, 1983, and home mortgages and business loans will not be available from federal agencies. Also, federal funds will not be available for the construction of new roads, bridges, water and sewer lines, and other structures.

"Spending on the barrier islands is now prohibited by the culprit most responsible for their foolhardy development — the federal government," said Jay Hair, executive vice-president of the National Wildlife Federation, and a former professor of zoology at N.C. State Univesity. "Each year, the government has spent almost a quarter-billion dollars to support construction of facilities that encourage development of these fragile areas. The federal government has also spent more than $43 million in the last three years on 6,400 flood-insurance claims for storm damage to property in 90 barrier communities.

"Barrier islands and beaches are in a constant state of flux to withstand the immense power of ocean storms. Development of these areas makes little sense — human life may be endangered, and damage to property is inevitable. In fact, attempts to reduce beach erosion in these areas — usually to save a handful of expensive homes that never should have been built on the beach — often worsens erosion problems. However, barrier islands, beaches, and associated wetlands offer valuable habitat for fish and shellfish, animals, waterfowl and shore birds. These areas should be left in a natural state as wildlife habitat and for the public to enjoy."

Eight areas in North Carolina — encompassing 52 miles of beach — are included in the act. These areas include portions of Currituck Banks (9.5 miles), Hatteras Island (2.5 miles), Shackleford Banks (8 miles), Onslow Beach complex (10.25 miles), Topsail Beach (6.25 miles), Lea Island (5 miles), Wrightsville Beach (1 mile), and Masonboro Beach (9.5 miles).

Quail Are For Casserole

Quail are undoubtedly the most delectable of all North Carolina's upland game birds. I realize that's a bold statement — for ruffed grouse and woodcock have their ardent followers, and dove hot off the charcoal grill isn't to be sneered at. But quail is the bird and February is *the* month for quail here in the Tar Heel state. Why? Despite grumblings that "it ain't what it used to be," quail hunting is still good here — excellent in much of the Coastal Plain — and a day afield more often than not yields enough birds for a dinner treat for the family and a treasured friend or two.

February is *the* month because by the time it arrives, the distractions of late fall and early winter, such as deer, duck, dove and squirrel hunting, have faded with the closing seasons. And generally by this time I've convinced Bell, my aging pointer, that the idea is to hunt somewhere in my general vicinity, rather than in the next county.

But the real reason that quail remains king, at least in my book, is that unlike many other types of wild game, it is virtually impossible to mess up in the kitchen. Deep fried, wrapped in grape leaves, broiled with wine sauce or served on toast, I don't recall having ever rejected a quail dish placed before me. Granted, I'm a bit more partial to some dishes than others and the following recipe for Quail In Casserole is a pot scraper.

Ingredients:

4 quail
salt
1/3 cup salad oil
1 carrot, finely chopped
1 small onion, minced
1 tablespoon minced green pepper
3/4 cup sliced fresh *or* canned mushrooms
2 tablespoons flour
2 cups stock *or* 4 bouillon cubes dissolved in 2 cups boiling water
1/3 cup white wine

Rub the whole birds lightly with salt, then brown in oil (or in part oil and part butter). Remove the heated casserole. In the same oil, saute carrot, onion, green pepper, and mushrooms slowly about 5 minutes. Blend in flour, then gradually stir in heated stock. Season to taste with salt; pour this sauce and wine over quail. Cover and bake in 350 F oven for about 1 hour, or until birds are tender . . . Serves 4

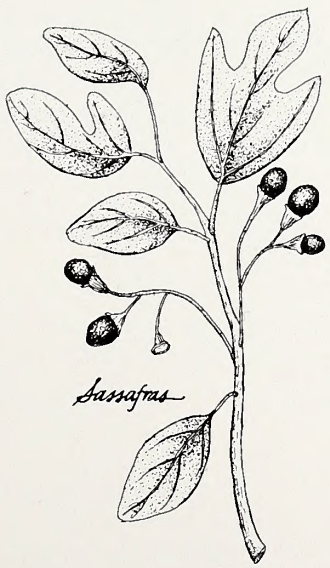
Served the evening of the hunt on a bed of yellow or wild rice, accompanied by steamed, buttered broccoli and a glass of fine white wine, it makes those tight calf muscles, frozen fingers, battles with catclaw briers, broken points and missed shots all worthwhile. If the shooting has been particularly poor, try it with deboned chicken breast — it's almost as good.

— *Curtis Wooten*

Eat "Out" Wild Foods

Start with a crisp poke salad and cold blackberry soup followed with rattlesnake salad and steaming barbequed ground hog. Top this off with sassafrass tea, and you have the makings of a first class meal! Or so say the people who will sponsor the eighth annual Wild Foods Weekend on April 15-17 at the Betsy-Jeff Penn 4-H Center near Reidsville.

The wild foods weekend focuses on the ancient tradition of foraging for your dinner. Small groups will learn how to safely identify, collect and cook wild foods. The climax of the event is the Wild Feast — a vast smorgasbord of traditional and creative dishes featuring natural ingredients. Other events include slide shows on plant identification, nature walks, bird watches, and demonstrations of dowsing, bee keeping, stone masonry and dulcimer making. In addition, teachers may receive continuing education credits from Rockingham Community College for participating.



For more information, write to North Carolina Wild Foods Weekend, P.O. Box 396, Elon College, N.C. 27244.

Book Review

Feeding Fido, by Joan Coan, Arthur L. Cone, Jr., and Robert H. George, D.V.M. Published by E.P.M. Publications, 1003 Turkey Run Road, McLean, Virginia 22101. Spiral-bound, 114 pp. To order, send $7 (includes mailing and handling) to Mrs. Joan Cone, P.O. Box 242, Williamsburg, Virginia 23187.

Joan Cone is well-known for her books on cooking wild game, and is a dog lover and experienced outdoorswoman as well. In this book, she has teamed up with her husband, Dr. Arthur Cone, and Dr. Robert George, a well-known veterinarian, to produce a real winner.

Feeding Fido is far more than a recipe book for dogs. A hefty portion of the book deals with dog nutrition — and tells how dog owners can offer their pets a healthy diet using commercial foods at little cost. Potentially a dry subject, the use of humor and illustrations make this entertaining reading. Information is also included on special diets for dogs with health problems.

However, the authors realize that dogs don't live by bread alone, and the heart of the book contains intriguing recipes that may add a little spice to Fido's diet. When we cooked up some of these canine concoctions at home, they quickly disappeared amidst growls of pleasure, lapping of plates and contented scratching. Imagine how well a dog would have liked them!

Gates Schools Richer

The Gates County school fund is now $5,721 richer thanks to a public sale of equipment confiscated from wildlife violators. The equipment was confiscated by the courts, and included 38 rifles and shotguns, an automobile, and a pickup truck. According to local wildlife enforcement officers, John Savage and Paul Linder, firelighting and deer hunting cases over the past few seasons accounted for the items.

"The equipment used in these violations is often quite sophisticated," said Savage. "For example, a 7-millimeter rifle and a Browning 12-gauge shotgun both sold for about $450. This proves that the image of a poacher as a poor backwoods character firelighting a deer to feed his family is false.

"The automobile that was sold was outfitted with special equipment for professional poaching. It included a 4-crystal scanner for monitoring wildlife radio channels, a citizen's band radio, a switch that cut off all lights except for one small yellow light mounted in the grill, a special plug so that two spotlights could be used at the same time, and a fiberglass tub in the trunk for holding deer carcasses."

This was one of the largest single sales of confiscated equipment from game law violations ever held in northeastern North Carolina. By law, funds from these sales — and fines from wildlife violations — are turned over to local public school districts.

— *Mike Overton*

Calendar

February 2-4
Southern Farm Show at the State Fairgrounds in Raleigh.

February 2-6
Mid-Atlantic Boat Show at the Greensboro Civic Center.

February 5-6
Southern Star Pro-Am Ski Classic at Beech Mountain in Banner Elk.

February 7-12
Sailboat Show at Crabtree Valley Mall in Raleigh.

February 17-19
5th annual Winterfest Arts and Crafts Festival at the Asheville Mall.

February 17-20
Boat show at the State Fairgrounds in Raleigh.

February 19
N.C. Bowhunter's Association Convention and Rendezvous at Northwest Guilford High School in Greensboro. For more information contact Dennis Allman, Route 4, Box 91, Morganton, NC 28655.

February 19-20
Gun Show at the State Fairgrounds in Raleigh.

February 19-27
North Carolina Home and Garden Show at the Civic Center in Raleigh.

February 27
Annual commemoration of the Battle of Moores Creek Bridge at the Moores Creek National Battlefield in Currie.

In Smokies

Report Poachers

The Great Smoky Mountains National Park urges citizens to report any poaching or arson that occurs within the park. Rewards of up to $500 will be paid for information leading to the arrest and conviction of anyone responsible for these crimes. All reports will be kept confidential.

"Poaching of wildlife and arson are both serious problems," said Richard Moeller, chief ranger for the park. "Not only are precious natural resources lost, but thousands of dollars are spent controlling these crimes."

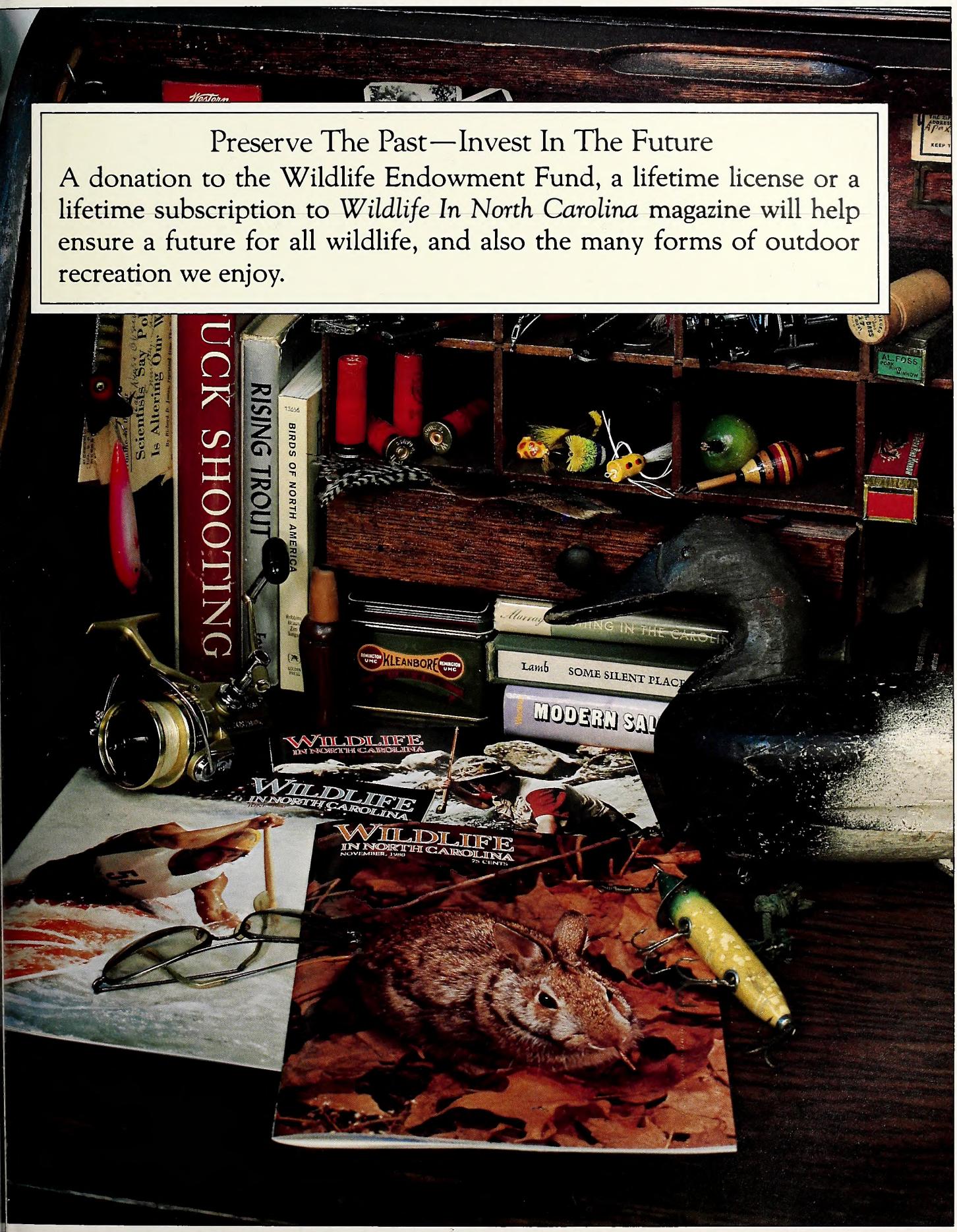
Anyone who wishes to report these crimes should contact Jerry Hobbs at Park headquarters at 615-436-5615.

Wildlife Endowment Fund Status Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina,* and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status on October 31, 1982

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	3328	$964,628.35
Lifetime Hunting License	41	7,044.31
Lifetime Fishing License	83	13,696.62
Lifetime Subscriptions to *Wildlife In N.C.*	81	8,664.54
Contributions		11,733.95
		Fund Total: 1,005,767.77



Preserve The Past—Invest In The Future

A donation to the Wildlife Endowment Fund, a lifetime license or a lifetime subscription to *Wildlife In North Carolina* magazine will help ensure a future for all wildlife, and also the many forms of outdoor recreation we enjoy.

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Hunters and Hounds

The bleak woods of February ring with a chorus of beagle voices as late-season rabbit hunters hark to the music.

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WILDLIFE IN NORTH CAROLINA

MARCH, 1983

75 CENTS

The Grist Of History

by Jim Dean

There is an unusual cabin in western North Carolina that I pass from time to time. Three huge millstones have been built into its rock chimney. Not far from there, along some of the streams I fish, I have seen the remains of old dams and raceways, and similar remnants are scattered along streams and small rivers virtually throughout the State. Once, I ate lunch seated on the edge of a huge millstone that projected from the muddy bank of a Piedmont stream. I could only guess how long it had been there.

In a sense, these millstones are like the arrowheads of an ancient civilization. In some cases, area residents have long since forgotten the origins of these old mill sites, or the names of the families that built or operated them. Some sites are well over 200 years old. Yet, beginning with the earliest settlement of North Carolina, grist mills were often the hubs of countless small communities. Along with farming, logging operations and an occasional roadhouse or tavern, grist mills were the earliest harbingers of the industrial sprawl that followed years later.

Early millers in North Carolina were among the most prominent citizens in a community. Many were wealthy, and at least maintained a fairly secure standard of living grinding grain for nearby residents. Corn and wheat were the most common grains ground between the huge, grooved wheels of stone. Usually a low dam was constructed to trap water which was then diverted as needed to drive a waterwheel. The waterwheel powered the machinery which turned the stones.

Oddly, little is known about the early history of grist milling in North Carolina, and research has turned up only scattered references. Apparently, no one knows how many grist mills were operating here in the 18th century, although at their probable peak during the late 1800s, there may have been more than a thousand.

Historian Alan D. Watson gives us a glimpse of early milling operations in present-day Edgecombe, Northampton and Halifax counties. "The most popular crop was Indian corn which satisfied not only the needs of the people, but was used to feed livestock as well," writes Watson. "The prominence of the grain crops, wheat and corn, gave rise to the very lucrative occupation of miller. The courts carefully considered petitions for grist mills, and rejected many because they would be too competitive with mills in the vicinity or because there would not be enough business to justify their existence. The small number of mill petitions granted by the Edgecombe Court, 14 for the years during which court records are available, 1744 to 1746 and 1757 to 1775, implies that grist mills remained in operation over long periods of time."

N.C. Archives and History

This old grist mill was located on Pool's Creek in western North Carolina, one of many that once ground the State's grain crops.

It is speculated that there may have been more grist mills in the upper Piedmont and mountains than in the Coastal Plain as civilization progressed westward because the swifter watercourses were more suited to small dams and mills.

The Eno River, a fall line stream just west of Durham, was probably fairly typical, and there are many known mill sites on it including the West Point Mill which was recently reconstructed as part of the Eno River Park.

There is little doubt that the construction of so many small dams had an effect on fish and wildlife populations. While the small bodies of water may have increased habitat for fish in warm-water streams, it is likely that they spearheaded the gradual decline in fresh-water trout habitat in cold mountain streams. Dams tend to warm water, and this may have affected populations of brook trout which were the only native species of trout (actually brook trout are char) found in mountain streams until the late 1800s.

Despite the development of more modern methods of grinding grain, several water-powered grist mills still remain in North Carolina, and stone-ground corn meal often brings a premium price when it can be found. Lassiter Mill on Crabtree Creek was once a rural mill until the city of Raleigh enveloped it, and it still produced superb meal until it burned 24 years ago. A few other mills survive to remind us of our links with the past, but the days when such mills were the centers of commerce are long gone, and all that remains of many of them is a place name, a pile of rubble or perhaps an old millstone buried in the mud.

North Carolina State Library
Raleigh
N. C. Doc.

March, 1983
Volume 47, No. 3

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

MAR 2 1983

CONTENTS

4 **Meet Norm L. Angler** *by Jim Dean*
The result of this mail survey gives fisheries' managers a better understanding of North Carolina's fishermen and their needs.

7 **Umbrella For The Environment** *by Rick Estes*
Many environmental groups are active in North Carolina, and they are having a beneficial effect on the quality of life here.

12 **Larry Barton, An Artist Comes Of Age** *by Jim Dean*
When Larry Barton put aside a career as a political cartoonist, lovers of outdoor art took notice.

18 **Jay Hair Speaks Out** *interview by Mark Taylor*
Since Jay Hair left North Carolina to become head of the National Wildlife Federation, he has been a leading voice for sound environmental decisions.

20 **CAMA Nine Years Later** *by Mark Taylor*
The Coastal Area Management Act has been with us nearly a decade, and despite controversy, it has helped our valuable coastal resources.

26 **Symbols Of The State** *by Lawrence S. Earley*
North Carolina's outdoor heritage is honored by a series of official state symbols which include several wildlife species.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

Back Of The Book *by Mark Taylor*

Cover *Larry Barton's magnificent painting titled "Bufflehead Drake" was painted in 1979 shortly after he resumed his career as an artist. "I was thinking of my boyhood memories on the shore of Lake Michigan just before the ice comes in, and I didn't initially plan to make the wave this big," said Barton. "I've seen many buffleheads in Michigan, and they're common here, too."*

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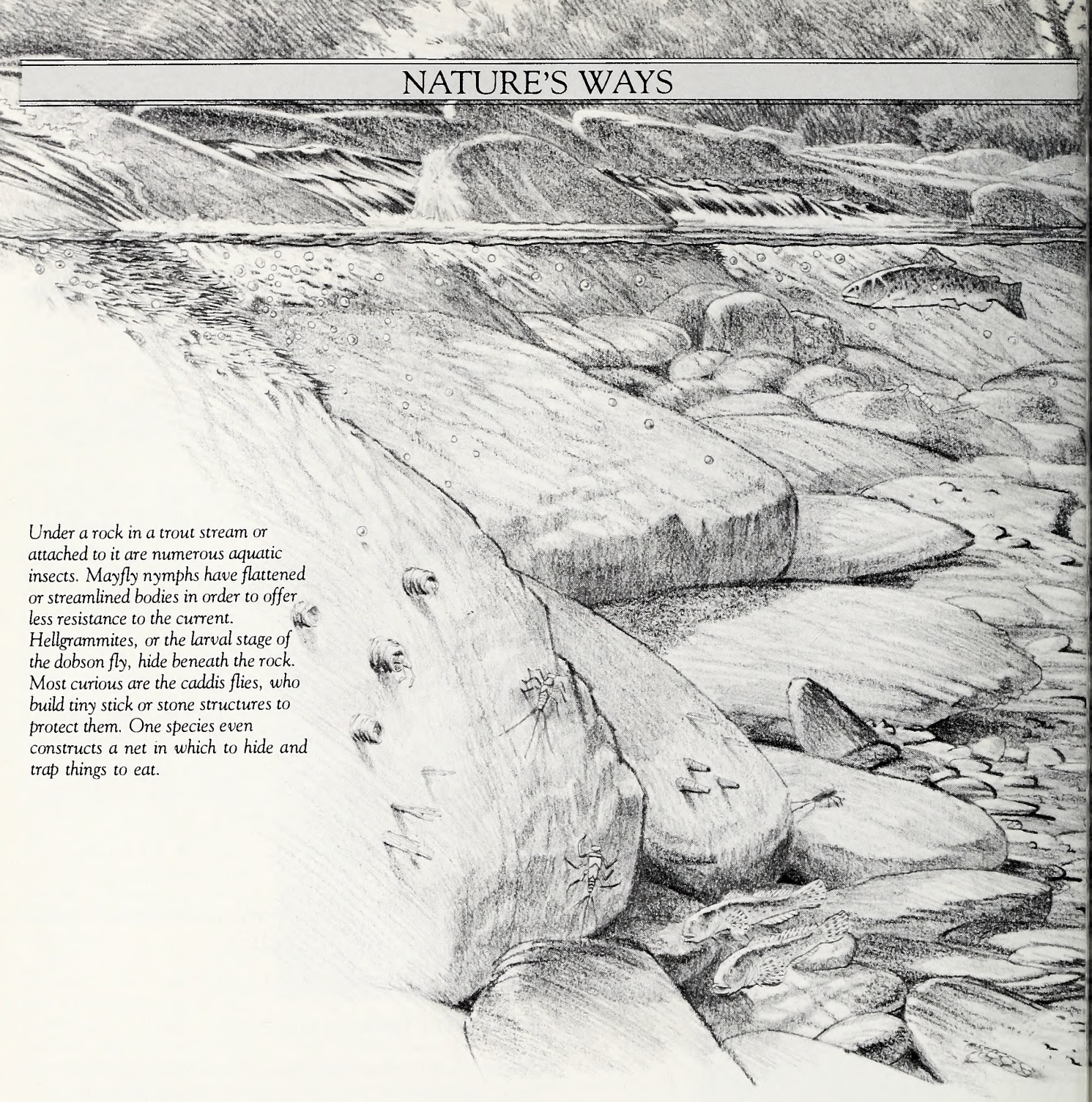


Under a rock in a trout stream or attached to it are numerous aquatic insects. Mayfly nymphs have flattened or streamlined bodies in order to offer less resistance to the current. Hellgrammites, or the larval stage of the dobson fly, hide beneath the rock. Most curious are the caddis flies, who build tiny stick or stone structures to protect them. One species even constructs a net in which to hide and trap things to eat.

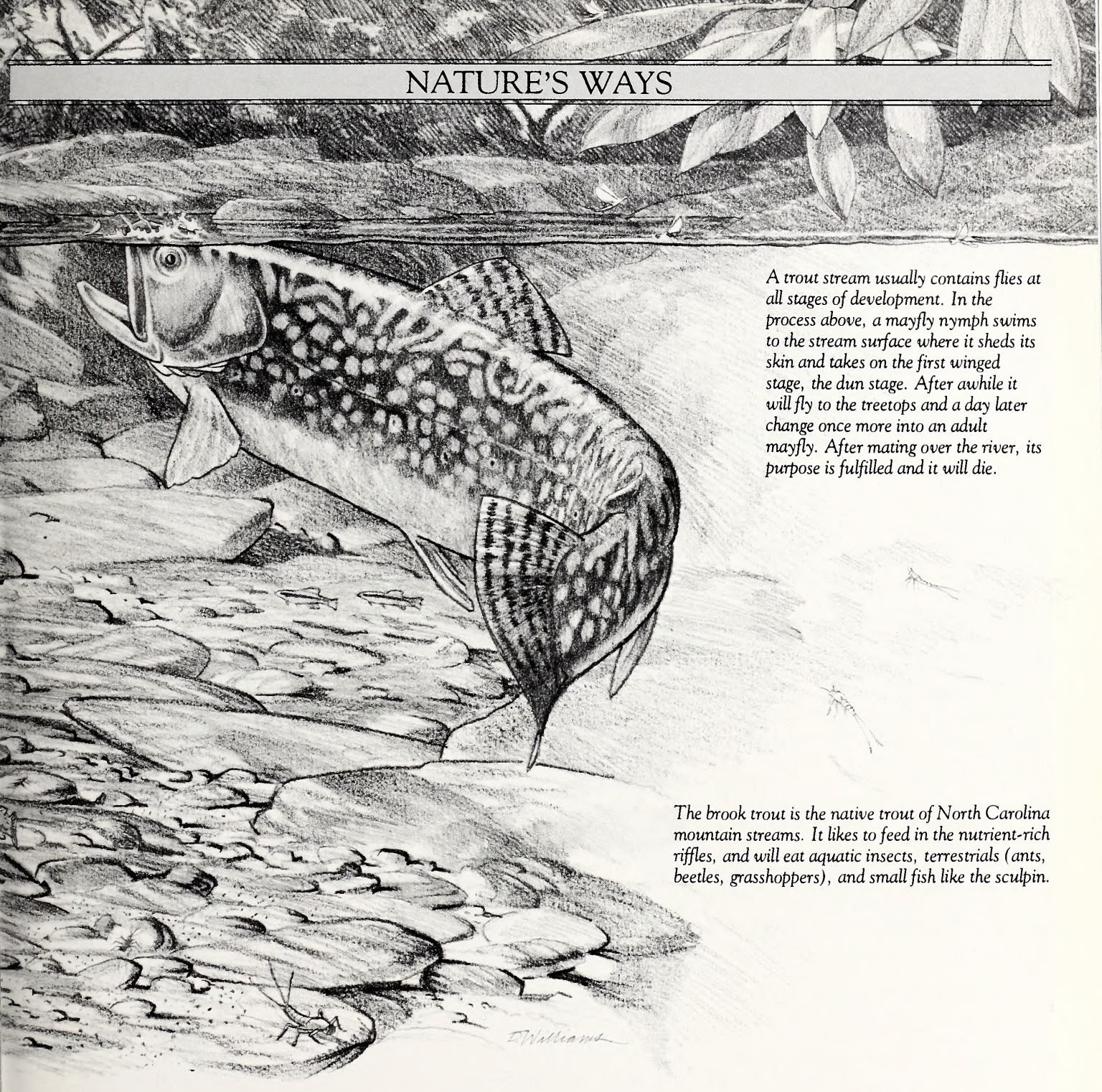
Life In A Trout Stream

by Lawrence S. Earley/illustrated by David Williams

North Carolina's trout streams are chock full of life, although most are so cold that it's easy to think otherwise. Pennsylvania's limestone streams, or the rivers of the far West, may be richer in life than our more acidic trout waters, but our 4,000 miles of trout streams have the same insects and other aquatic creatures, just not as many. Trout feed on all of them.

Like other freshwater streams, trout waters really consist of two quite different habitats: shallow fast-water areas called riffles, and quiet pools. The riffles contain much of the aquatic life. The fast water replenishes the oxygen supply and brings in nutrients from upriver. This is where trout often like to feed, though they also feed in the pools.

What the trout find in the riffles are mainly different kinds of aquatic insects such as mayflies, caddis and stoneflies. Mayflies are the most numerous here — there are more than 500 species worldwide. They have three very different stages of life. They begin their lives as six-legged nymphs, hiding beneath rocks for a year or so until in the spring and summer they swim to the surface and hatch into the first winged stage, the dun. After 24 hours, the duns shed their skin again and as mature adults now they mate over the streams in dancing swarms, lay their eggs and a few



A trout stream usually contains flies at all stages of development. In the process above, a mayfly nymph swims to the stream surface where it sheds its skin and takes on the first winged stage, the dun stage. After awhile it will fly to the treetops and a day later change once more into an adult mayfly. After mating over the river, its purpose is fulfilled and it will die.

The brook trout is the native trout of North Carolina mountain streams. It likes to feed in the nutrient-rich riffles, and will eat aquatic insects, terrestrials (ants, beetles, grasshoppers), and small fish like the sculpin.

hours later fall into the stream again where they are consumed by trout. Trout will also eat the nymph and dun stages.

The life cycles of the other aquatic insects are similar to that of the mayfly. Both mayfly and stonefly numphs have adapted in various ways to live in the fast-flowing water of the riffles. Some have streamlined bodies, other have flattened bodies, both designs offering less resistance to the current. Some are equipped with hooks which grasp onto smooth rocks. The caddis nymphs, meanwhile, build curious shelters, some out of sand, some out of small sticks, that will protect them from the current.

Other trout foods are small minnows, like the black-nosed dace, and the sculpin, a 3- to 5-inch fish with fanlike dorsal fins and an unforgiveably ugly face. It hides itself underneath stones on the stream bottom where the hellgrammite, or the larval stage of the dobson fly, is also hiding. Trout will discover them and eat them, however. Trout will also eat terrestrial creatures — the ants, beetles, grasshoppers and other land-dwelling insects that accidentally fall into the stream and ride its surface.

Pools provide resting places for trout, but while there they will not turn down certain types of mayflies that inhabit the pool area. And if it's a brown trout it will especially favor the crayfish found in pools, prowling the shallows at night to take the small crustaceans as they feed. Indeed, some anglers believe big browns are so fond of crayfish that they rarely feed anytime except at night. But most trout fishermen have the faith of Job that tossing a dry fly into a riffle on a warm afternoon will lure a big brown away from the delectable crayfish. And sometimes it's even been known to happen that way.

Meet
Norm L. Angler

He's a boat fisherman who prefers to catch bass and crappie, tries his luck more than 20 times a year and considers fishing fairly good.

by Jim Dean

Chances are you'd like ol' Norm. The two of you would probably have a big time fishing together because you're so much alike. That's no accident. In fact, Norm L. Angler is a lot like most fishermen in North Carolina because he's a statistical composite of the average angler (but don't tell Norm; he hates to think he's merely average).

According to Division of Inland Fisheries' biologist Scott Van Horn, the idea was to try to find out more about fishermen in North Carolina.

"We wanted to know what fishermen liked to catch, how they liked to fish, what they knew about our programs, how often they fished and a whole lot of other things," said Van Horn. "In the past, attempts to learn what the State's anglers want have not always furnished enough information. We hear from fishermen in the field, at public hearings, through the mail and in other ways, but this has never given us a truly representative picture of the attitudes and desires of a cross section of our fishermen."

Armed with a better understanding of these things, the N.C. Wildlife Resources Commission can plan its fishery-management program so that it more closely meets the needs and desires of fishermen.

"The most effective and practical way to estimate the needs and preferences of fishermen on a regional or statewide level is through a mail survey," said Van Horn. "In 1981, 4,041 names and addresses were randomly selected from various types of fishing license holders. Each was sent a letter of introduction and an activity and opinion survey to fill out and return. The 2,347 responses which were returned were compiled and analyzed by the Institute of Statistics at NCSU."

The results show that ol' Norm — and his buddies — are fairly serious fishermen. Some 45 percent, for example, made more than 20 fishing trips per year, and 59.5 percent fished from a boat. The most popular fishing spots were large reservoirs of 1,000 acres or more, but warmwater streams and rivers ran a close second.

Apparently, many fishermen consider fishing fairly good in North Carolina. Forty-two percent indicated that their fishing was good or very good, and another 45.2 percent had fair luck. Only about 13 percent reported poor or very poor success.

Among licensed fishermen, the largemouth bass reigns supreme, and nearly 70 percent ranked ol' bucketmouth first. Crappies ranked a strong second at nearly 56 percent, while other sunfish (such as bluegills, shellcrackers, etc.) ranked third at about 39 percent. Interestingly, about 30 percent indicated that they fished for anything that would bite.

Striped bass in fresh water have obviously won the hearts of a sizeable number of North Carolina fishermen. Approximately half of all those surveyed fished at least once for stripers in North Carolina reservoirs during 1980. This indicates that the Wildlife Resources Commission's striped bass introductions have made a substantial contribution to the State's overall fishery program.

Apparently Norm L. Angler is well acquainted with only a few of the Wildlife Commission's programs. More respondents were aware of the Commission fish kill investigations than any other activity (44 percent), with striped bass management (30 percent), pond-management assistance (25 percent) and preparation of fishing regulations (23 percent) next in line. Twenty-nine percent did not recognize any of the 13 programs listed.

Half of those surveyed also felt that the Commission's fishery management program was either satisfactory or very satisfactory, although another 40 percent did not know enough about it to evaluate it, or were neutral.

Norm L. Angler and his fishing buddies are also obviously concerned about environmental threats to their sport. Forty-six percent listed fluctuating water levels as a major limitation on fishing success, while pollution (36 percent) and overfishing (35 percent) ranked second and third.

"There are many ways we can use this information," said Van Horn. "In some cases, we have realized that we need to do a better job of letting fishermen know about some of our programs. For example, while fishermen were familiar with fish kill investigations and striper management, relatively few were aware of the extensive work we've done on many other programs such as forage stocking, fish attractors or steelhead trout stockings.

"Generally, fewer than one angler in three is aware of any specific program, and this was true even for the public hearings the Commission holds annually to receive public input into proposed fishing regulation changes," said Van Horn. "Obviously, we need to find better and more effective ways to get the word out.

"In some cases, we can use this information to place more emphasis on programs that are popular or are needed," said Van Horn. "It appears that we might want to consider maintaining existing trophy fisheries' programs, since our trophy bass lakes program is very popular. It is also obvious that crappies are a very popular gamefish, one we might want to give greater consideration to in developing our future programs. Also, we could make better use of our sunfish and catfish species.

"These are some of the evaluations we can make, and there will undoubtedly be others," added Van Horn. "In the long run, this survey should help us offer better fishing for everyone."

And what about our friend, Norm L. Angler? Suppose he changes over the years, develops new fishing interests, concerns or needs? Van Horn has an answer for that. Plans are to repeat the Angler Opinion Survey at five-year intervals. It will be especially interesting to see how anglers respond next time. Stay tuned, folks . . .

Until fairly recently, the bluegill was North Carolina's favorite species among anglers, but the largemouth bass has taken a firm hold on first place according to the results of a survey. The crappie has moved into second place.

Tim Hergenrader

Results Of Angler Opinion Survey

(The answers represent a percentage of the number of respondents)

The mail survey was sent to 4,041 randomly-selected names, and 2,347 responses were returned. One of the interesting findings is that the largemouth bass has become the State's most popular gamefish by a wide margin.

1. How many times did you go fishing in freshwater in North Carolina during calendar year 1980?
   - 9.7 — 0
   - 13.3 — 1-5
   - 14.6 — 6-10
   - 17.4 — 11-20
   - 45.0 — More than 20

2. In what types of water do you fish most often? (check one)
   - 26.7 — Warmwater streams and rivers
   - 13.1 — Coldwater streams
   - 27.7 — Reservoirs (greater than 1,000 acres)
   - 15.8 — Small lakes (25-1,000 acres)
   - 16.7 — Ponds (less than 25 acres)

3. Of the following fishes, rank the three you fish for most often (1 — fish fished for most; 2 — second most often; and 3 — third most often).
   - 19.8 — Mountain trout
   - 69.7 — Largemouth bass
   - 16.5 — Smallmouth bass
   - 55.5 — Crappie
   - 39.3 — Other sunfish (bream, shellcracker, etc.)
   - 30.3 — Catfish
   - 19.5 — Striped bass
   - 1.2 — Muskellunge
   - 6.1 — Other
   - 25.9 — Anything that bites

4. Is most of your fishing done from:
   - 59.5 — Boat
   - 30.6 — Bank
   - 2.9 — Dock or pier
   - 7.0 — Wading

5. Which is most important to the success of your fishing trip?
   - 8.6 — Catching large numbers of fish
   - 26.0 — Catching large-size fish
   - 43.0 — Both equally important
   - 23.4 — Neither is important

6. How would you rate your overall fishing success in North Carolina inland waters?
   - 9.1 — Very good
   - 32.8 — Good
   - 45.2 — Fair
   - 10.7 — Poor
   - 2.2 — Very poor

7. How would you rate the Wildlife Resources Commission's fishery management program?
   - 9.6 — Very satisfactory
   - 40.9 — Satisfactory
   - 17.7 — Neutral
   - 6.9 — Unsatisfactory
   - 2.6 — Very unsatisfactory
   - 22.3 — Don't know

8. Are you aware of the following programs?
   - 29.6 — Striped bass management
   - 44.0 — Fish kill investigations
   - 14.6 — Hybrid bass research
   - 18.1 — Trout stream reclassifications
   - 12.0 — Catchable trout program
   - 12.6 — Muskellunge stocking
   - 17.8 — Trophy bass lakes
   - 7.0 — Fish attractor program
   - 8.8 — Forage stocking
   - 5.7 — Steelhead trout management
   - 24.9 — Pond management assistance
   - 22.8 — Preparation of fishing regulations
   - 16.7 — Bass-catch survey
   - 29.4 — Not aware of any of these programs

9. Are you a member of an organized sportsman's club?
   - 16.8 — Yes
   - 83.2 — No

10. From where do you receive the most information concerning Wildlife Resources Commissions programs?
    - 21.8 — Newspaper
    - 12.1 — Television
    - 1.6 — Radio
    - 35.8 — Magazines
    - 20.1 — Other anglers
    - 8.6 — Other

11. Do you read the Wildlife Commission's magazine, *"Wildlife in North Carolina"*?
    - 43.5 — Yes
    - 56.5 — No

12. Are you aware that the Wildlife Resources Commission holds annual public hearings to receive public input into proposed fishing regulation changes?
    - 37.8 — Yes
    - 62.2 — No

13. Do you favor stocking of the following fishes by the Wildlife Resources Commission?

— Striped bass	82.1 Yes	3.3 No	14.6 No opinion
— Hybrid bass	62.8 Yes	4.9 No	32.3 No opinion
— Tiger muskie	39.5 Yes	8.5 No	52.0 No opinion
— Steelhead trout	51.2 Yes	4.4 No	44.0 No opinion
— Flathead catfish	48.1 Yes	10.4 No	41.5 No opinion
— Spotted bass	57.6 Yes	3.6 No	38.8 No opinion

14. How often did you fish for striped bass in North Carolina reservoirs during 1980?
    - 51.5 — 0 trip
    - 34.3 — 1-5 trips
    - 14.2 — More than 5 trips

15. Did you catch a striped bass from a North Carolina reservoir during 1980?
    - 24.9 — Yes
    - 75.1 — No

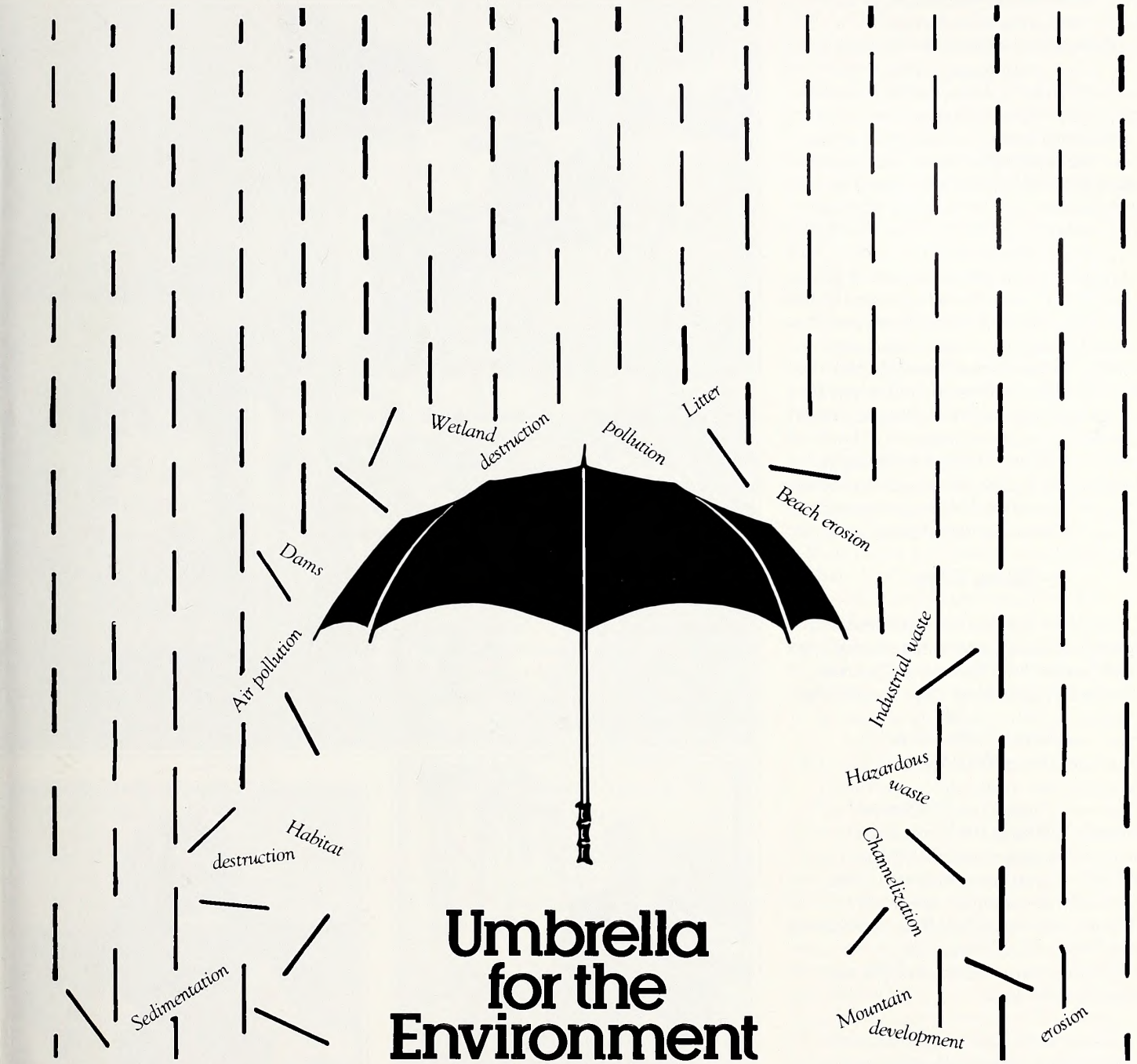
16. During 1980, did you fish for:
    - 4.8 — Native (wild) trout
    - 4.1 — Stocked trout
    - 18.9 — Both
    - 72.2 — Did not fish for mountain trout

17. If you fished for mountain trout, did you use:
    - 18.6 — Artificial lures
    - 22.9 — Natural bait
    - 58.5 — Both

18. What is your attitude toward fishing tournaments?
    - 12.5 — Strongly favor
    - 24.6 — Favor
    - 50.5 — Neutral
    - 7.6 — Oppose
    - 4.8 — Strongly oppose

19. What factors do you feel limit the quality of fishing in your area? (check one or more)
    - 46.4 — Fluctuating water levels
    - 36.6 — Pollution
    - 35.7 — Overfishing
    - 13.3 — Aquatic vegetation
    - 15.6 — Lack of cover
    - 14.8 — Too many nongame fish
    - 12.1 — Other
    - 13.5 — Don't know

20. What percent of your fishing time is spent fishing in:
    - 83.5 — Fresh (inland) waters
    - 16.5 — Salt (coastal) waters



Umbrella for the Environment

by Rick Estes

People working together play an important role in protecting our environment. Here are some of the most effective groups in North Carolina.

Several years ago a friend and I used to fish an old gravel pit in Sylva that had filled with seepage from Scott's Creek. This was hardly an idyllic setting since the pond was easily seen from the main highway just 40 yards away, and there were houses on the hills across the road. Secondary roads formed two other boundaries of the small quarry. And yet, the pond was a real find. There was an occupied beaver lodge in its center, and we often saw wood ducks circling. Muskrats, blacksnakes, red-winged blackbirds, turtles and some nice bass and bluegills called the little pond home.

John and I fished that pond several times. We caught fish, we never saw more than two other fishermen, and sitting out there in John's leaky old wooden boat we always felt like we were on some un-named North Woods lake.

Today, the pond site is home to two county-owned trash dumpsters, and the water, like the wildlife it supported is being displaced by fill dirt from nearby construction projects. You probably have a favorite spot, too. Chances are, if you have visited this spot over a period of years, you have seen it change. The changes may have been nothing more than the seasonal cycles, or the maturing of the trees on the area, or perhaps the successive changes in plant communities that take place in nature over a long time. But you probably

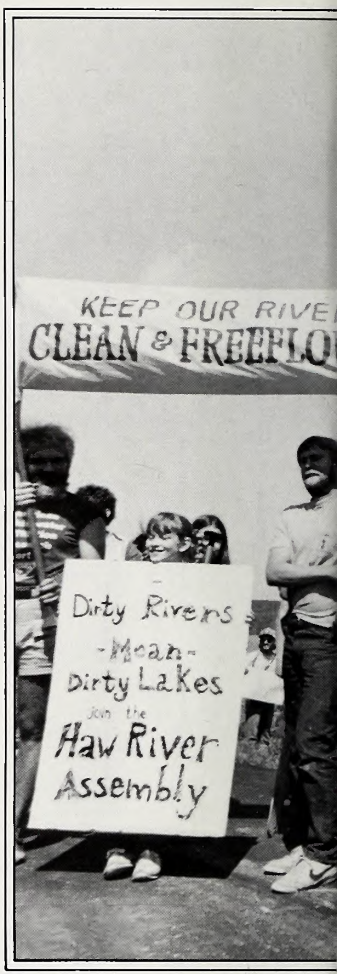
have also seen man-made changes — litter, commercial or residential developments, water or air pollution.

With few exceptions, our favorite outdoor haunts of years past are in a poorer state today. If you're depressed over it, if you feel that there is nothing you can do about the trend, take heart. There are others in North Carolina who wish to maintain our quality of life and who are doing something about it. They would like you to join in the effort.

Environmental and conservation groups in North Carolina are taking several routs to achieve their objectives. Some are taking opponents to court, others are lobbying in the General Assembly for environmental legislation, and others are buying up prime natural habitats to protect them for future generations.

Who are these conservation groups? What are their goals? How can you become a part of their efforts? Here are three of our most active environmental groups.

Bohdan Hryneuych



Bohdan Hryneuych

Many environmental groups work on behalf of specific rivers or specific wildlife species, like ducks, trout and turkey. The Haw River Assembly has brought attention to health hazards in the Haw River. Last summer, the group sponsored a canoe trip along the Haw for NRCD Secretary Joseph W. Grimsley (above) and other staff members.

Sierra Club

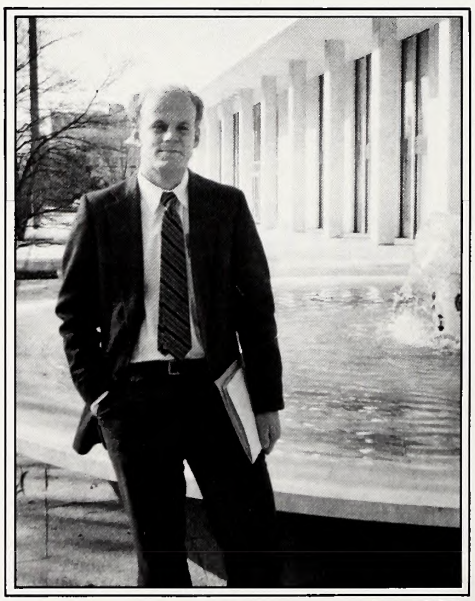
One of the best known environmental groups in the country and here in the State is the Sierra Club. The Sierra Club was organized by John Muir and others in San Francisco in 1892, primarily because of their concern for the Sierra Nevada mountains. Since World War II, the club has grown into a national conservation group with chapters in all 50 states. Between 1980 and 1982, the club's membership grew from 200,000 to 340,000. During the same period, the North Carolina chapter, originally affiliated with South Carolina, grew in size from 2,500 to 5,000 members.

The purposes of the Sierra Club are stated in its by-laws:

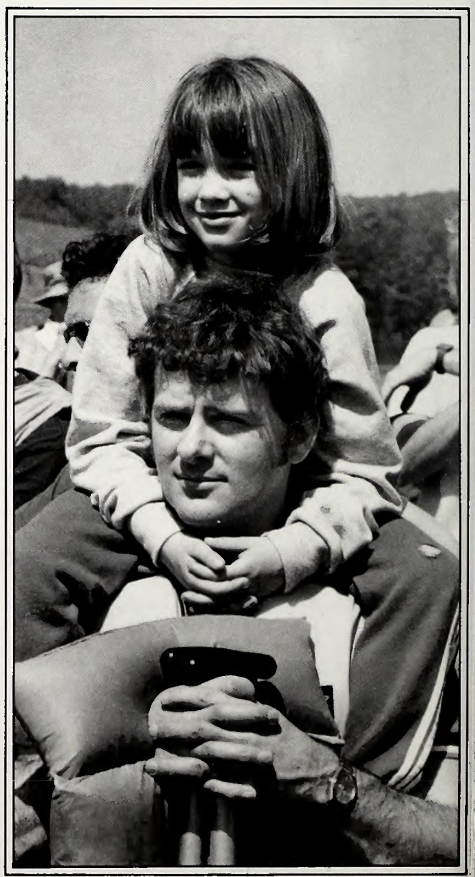
> "To explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; to educate and enlist humanity to protect and restore the quality of the natural and human environment; and to use all lawful means to carry out these objectives."

The North Carolina chapter has adopted specific goals. These include supporting certain national conservation campaigns, such as the efforts to maintain a strong Clean Air Act. Sierrans also lobby state legislators for environmental laws, and are becoming more closely involved with State and federal agencies on conservation issues, such as stream channelization and wetland protection.

Environmental watchdog William Holman is a lobbyist for the Sierra Club and Conservation Council of North Carolina, working in Raleigh on behalf of environmental concerns such as a strong CAMA program, a bottle bill and hazardous waste legislation.

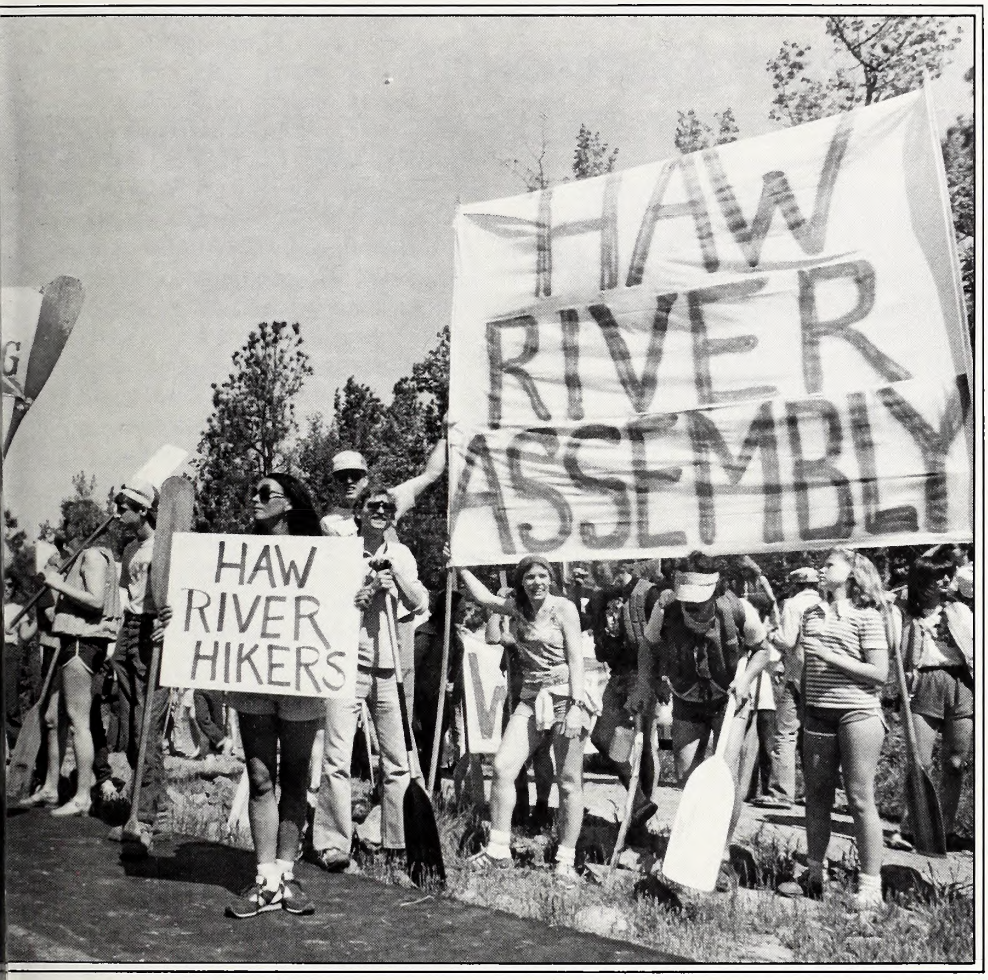


Lawrence S. Earley



Bohdan Hryneuych

Specific issues where Sierra Club members are active include support of the Coastal Area Management Act, repeal of a federal amendment that would limit North Carolina environmental standards to federal levels, the protection of wilderness and other critical lands, and the monitoring of oil, gas, and other mineral exploration off-shore and on federal and



state lands. Such explorations have been proposed for the Croatan, Uwharrie, Pisgah and Nantahala National Forest. The Sierra Club has also supported passage of a so-called "Bottle Bill" requiring a deposit on beverage containers, and has opposed utility company charges to consumers for construction work in progress on power plants.

According to James S. Dockery Jr. of Winston-Salem, executive chairman of the State chapter, outstanding local conservation achievements have included the approval by Congress of wilderness designation for the Joyce Kilmer/Slickrock Creek area in Graham County, and Wild and Scenic Rivers classification for the New and Chatooga Rivers.

Thirteen active Sierra Club groups are located across the State from Asheville to Wilmington. These groups usually meet monthly and sponsor numerous outings for members. Local groups are also increasingly active in conservation issues and political campaigns for candidates who support environmental legislation. All the North Carolina candidates supported by the Sierra Club won election in 1982, and nationally 80 percent of their slate was successful.

Conservation Council Of North Carolina

Another conservation group that is perhaps not as widely known as the Sierra Club is the Conservation Council of North Carolina. CCNC was started in the early 1970s to protect Bald Head Island from development. Like the Sierra Club, the Conservation Council has grown, especially since the 1980 elections. The group now numbers 600-700 members statewide.

The Council has concentrated its conservation efforts on lobbying for environmental legislation and on working closely with State and federal agencies involved with environmental issues. They have been the foremost environmental lobby in the State, and employ a full-time lobbyist for that purpose. The Council and the Sierra Club now share that effort and support many of the same conservation programs.

In addition to supporting the Coastal Area Management Act, a bottle bill, and opposing the proposed limiting of state environmental standards to federal levels, CCNC is also a strong advocate of proper management of hazardous wastes. Their program, Pollution Prevention Pays– or PPP– is aimed at educating industry to the environmental advantages–and economic benefits– of recycling wastes.

The development and use of alternate energy sources is another major goal of the Council. Jane Sharp, Council president, maintains that there is considerable interest in some parts of the State in using municipal wastes as sources of energy. She is also pushing for expanded use of solar, wind, water, and wood energy.

CCNC closely monitors State and federal agencies, institutions, boards and commissions that deal with natural resource issues. It has worked with the State hazardous waste management task force and with the North Carolina Wildlife Federation on wetland protection, and is involved in helping new conservation groups get started. John Runkle, executive coordinator of the Council, is assisting in the formation of a coalition of groups organized to protect specific rivers.

If my friend and I had enlisted the Sierra Club or the Conservation Council to help us save that little quarry pond, we just might have taken someone to court. Another group interested in natural areas would have taken a different tack — they might have bought the property.

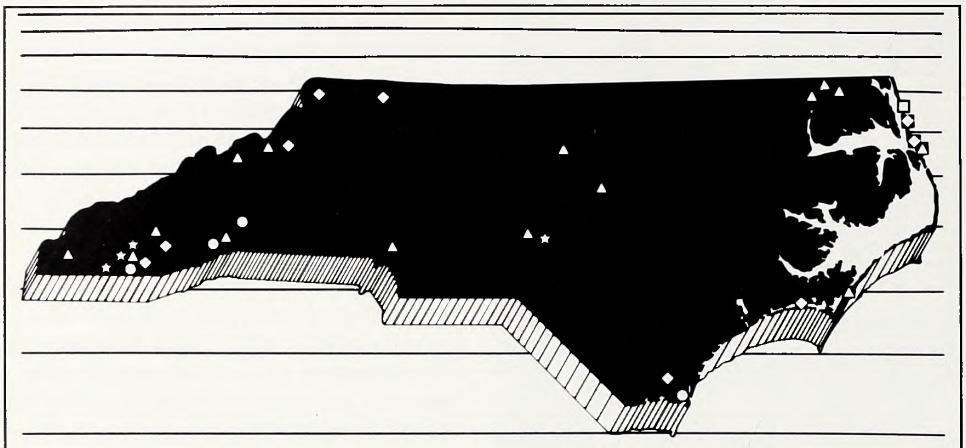
The North Carolina Nature Conservancy

The North Carolina Nature Conservancy is a chapter of the Nature Conservancy, a national, private, non-profit conservation organization. The Conservancy's sole objective is "the preservation of ecologically and environmentally significant land and the diversity of life it supports," according to its published mission. Since the state chapter was established in 1977, almost 85,000 acres of North Carolina's special mountains, forests, marshes, swamps, and islands have been protected through its conservation efforts.

Bill deBuys, the new director of the Conservancy, is quick to point out that his group cannot preserve everybody's favorite nook and cranny. "We're looking for natural habitats that meet certain carefully established criteria," he said. "This usually means a piece of land that has some rare plant or animal life, and that no other group or individual is already protecting."

When such a piece of property is located, the Conservancy may purchase it, or it may persuade the owner to donate it, or it may assist another group in acquiring it. With all three methods, the Conservancy has been very successful.

The Nature Conservancy in North Carolina



	Property	County	Acreage
○	Bald Head Island	Brunswick	1,000
	Bat Cave	Henderson/Rutherford	93
	Rainbow Springs	Macon	1,200
	East Flat Rock Bog	Henderson	½
◇	Bluff Mt.	Ashe	710
	Carrot Island	Carteret	474
	Monkey Island	Currituck	6,508
	Green Swamp	Brunswick	13,850
	Nags Head Woods	Dare	304
	Timber Ridge	Jackson	20
	Henry Wright	Macon	22
	Roan Mt.	Mitchell/Avery	2,220
	Saddle Mt.	Surry	950
✪	Standing Indian Mt.	Clay	1,600
	Olive Tract	Macon	4
	Pinky Falls	Macon	6
	Boyd Estate	Moore	220
△	Great Dismal Swamp	Camden/Gates/ Pasquotank	20,613
	Core Banks	Carteret	950
	Dabo Track (Nantahala N.F.)	Cherokee	9,203
	Jockey's Ridge State Park	Dare	62
	Merchants Millpond State Park	Gates	925
	Chowan Swamp	Gates	10,844
	Carl Sandburg Nat'l. Historic Site	Henderson	17
	Balsam/Bonas Defeat	Jackson	39,000
	Freedlund Tract (Nantahala N. F.)	Macon	89
	Mountain Island Lake	Mecklenburg	427
	Boyd Forest	Moore	403
	Eno River State Park	Orange/Durham	496
	Hymettus Woods Park	Wake	5
	Stone Mt. State Park	Wilkes/Alleghany	2,749
	Celo Knob	Yancy	2,396
□	Swan Island	Currituck	1,412

✪ PROPERTIES TRANSFERRED TO PRIVATE AGENCIES

△ ACQUISITIONS AND EASEMENTS GOVERNMENT BODIES

EASEMENTS/LEASES HELD ○

ACQUISTIONS FOR ◇

PROPERTIES OWNED □

The Nature Conservancy of North Carolina has acquired over 131,000 acres of special lands — marshes, swamps, mountains, forests and islands.

For example, in 1979 Weyerhauser Corporation gave 20,613 acres of the Great Dismal Swamp to the Conservancy; in 1979 the Conservancy bought nearly 10,000 acres in the Chowan Swamp, valued at $1,800,000, for $400,000; and in 1977 it bought the Jockey's Ridge property in Dare County and then gave it to the North Carolina Division of State Parks. The total of all property protected by the Nature Conservancy and the North Carolina chapter in the state is nearly 131,000 acres valued at over $55 million. And once acquired, these lands are not locked up. Traditional uses of the properties are allowed to continue as long as the quality of the habitats is not threatened.

Obviously, much of the success of the Conservancy in acquiring lands has been due to the willingness of the landowners to cooperate. In fact, much of this property has been donated.

Traditionally, landowners have had significant economic incentives to give property to tax-exempt organizations like the Nature Conservancy. "That is still true," says deBuys, "but, under current policies of the federal government administration, those incentives are diminished considerably. On the other hand, those same policies may actually encourage concerned landowners to work with us because they realize the federal government is less likely to acquire and preserve vital natural areas than in the past."

The Conservancy's funds for land purchases come from individual and corporate conservation projects, from the members themselves, and from other foundations and gifts. The membership of the group today is approximately 3,500-4,000.

The full-time staff of the state chapter consists of just five people, so they rely on volunteers and technical experts in other groups, especially the North Carolina Natural Heritage Program, for much of the land evaluation and management that must be done.

The Sierra Club, the Conservation Council of North Carolina, and the state Nature Conservancy share several common goals and characteristics but perhaps the most important is that they all represent individuals, private citizens, working together for a better environment for us and for those who will come later.

Each of these groups, and other environmental/conservation organizations, encourage interested people to contact them for more information about their goals and projects.

Environmental Groups To Join

The Sierra Club of North Carolina, the North Carolina Nature Conservancy, and the Conservation Council of North Carolina invite you to contact them for information about their activities or to join their group:

Sierra Club, North Carolina Chapter
PO Box 2860
Winston-Salem, NC 27102

The North Carolina Nature Conservancy
PO Box 805
Chapel Hill, NC 27514

Conservation Council of North Carolina
307 Granville Road
Chapel Hill, NC 27514

There are several other important environmental/conservation groups in the State. Generally, these are concerned with more specific issues, or with certain geographic features, outdoor pursuits, or wildlife species. However, all these groups are conservation organizations and they stress the interrelatedness of all natural resources.

These groups are no less important than the three organizations featured in this article, and if your interests are related to theirs, you certainly should contact them.

Carolina Bird Club
PO Box 27647
Raleigh, NC 27611

Carolina Bird Club is more than a group of birdwatchers, although that is a major part of its activities. The group was founded in 1937 and is a non-profit educational and scientific association dedicated to the study and conservation of wildlife, particularly birds. Membership is open to the public.

Ducks Unlimited
PO Box 66300
Chicago, Illinois 60666-0300

Seventy percent of our waterfowl comes from Canada, and yet there is no federal program in that country to protect the wetlands where the birds breed. If you are a waterfowl enthusiast, you need to know about Ducks Unlimited. Ducks Unlimited is a private fund-raising organization that leases wetlands habitat in Canada. North Carolina's chapter numbers 14,000 members, and was the first state east of the Mississippi River to raise over $1 million.

Eno River Association
4015 Cole Mill Road
Durham, NC 27712

This private conservation group is one of the oldest in the State. Now in its 17th year, its primary goal has been the protection of the Eno River, and that is still its major objective. In recent times, however, the group has become involved in various conservation projects, including working with other river protection groups, and fighting to protect the Currituck Outer Banks and Jockey's Ridge from development. The Eno River group was instrumental in bringing the Nature Conservancy to North Carolina.

Friends of State Parks, Inc.
4204 Randleman Road
Greensboro, NC 27406

If you enjoy hiking, camping, picnicing, or just observing nature in our State Parks, this is the group for you. Friends of State Parks was organized with the sole purpose of supporting the State's park system. It is a private, non-profit group that represents the parks' interests for the public.

North Carolina Audubon Council
Box 2693
Chapel Hill, NC 27514

The North Carolina Audubon Council is the central group for seven local Audubon Society Chapters in the State with a combined membership of about 3,500. The Society's four main activities are education, research, sanctuaries, and citizen action. Local chapters meet monthly and provide outings for members and the public. They also select and carry out various conservation projects, such as building and maintaining observation platforms at bird sanctuaries, establishing nature trails at State Parks, managing red-cockaded woodpecker habitat, and erecting bluebird and wood duck boxes.

North Carolina Rivers Coalition
307 Granville Road
Chapel Hill, N.C. 27514

There are many groups that have formed with the purpose of protecting a particular river. The Eno River Association, the Haw River Assembly, the Pamlico-Tar River Foundation are only three of the active groups in the State. The N.C. Rivers Coalition was formed out of present river groups to pool information and offer help to others interested in a river in trouble.

North Carolina Wildlife Federation
1033 Wade Avenue
Suite 126
Raleigh, NC 27605

The N.C. Wildlife Federation, a chapter of the National Wildlife Federation, is a conservation organization dedicated to the wise use and protection of wildlife and fish and all related natural resources. Through affiliated local wildlife clubs, the group's membership stands at around 30,000. The Wildlife Federation sponsors conservation and education projects around the State, and supports various habitat protection programs.

North Carolina Wild Turkey Federation
33 Southwicke Drive
Arden, NC 28704

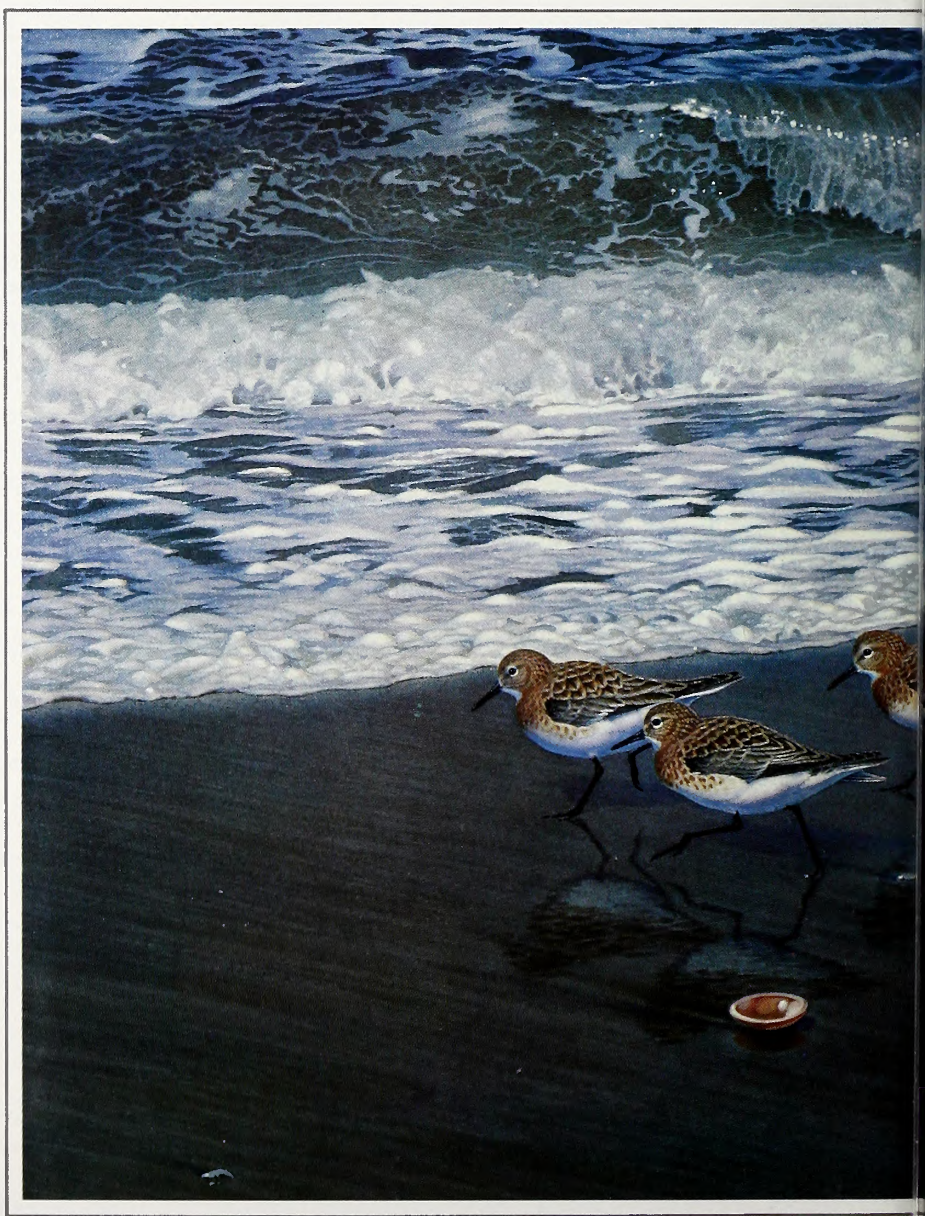
A chapter of the National Wild Turkey Federation, the State group is dedicated to the protection and expansion of wild turkey populations in the State through public-education programs and support of professional wildlife management efforts. It has undertaken several habitat improvement projects that benefit all wildlife species, and together with the N.C. Bowhunters Association, offers a $400 reward for information leading to the arrest and conviction of wild turkey poachers.

Trout Unlimited
Box 867
Conover, NC 28613

Trout Unlimited is a statewide council with 12 chapters working for the protection and enhancement of the cold water fishery resource. Trout Unlimited works cooperatively with state and federal agencies and other groups on various projects aimed at protecting and improving the quality of the waters in the western part of the State.

Larry Barton, An Artist Comes Of Age

One of the best of the current crop of wildlife and outdoor artists is this Winston-Salem resident.

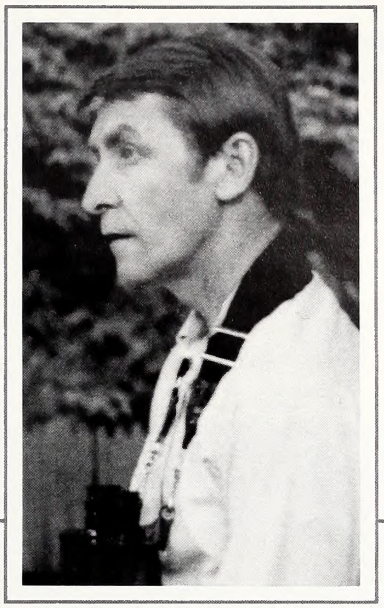


by Jim Dean

"When I work, I strive to do a painting, not just a species study or a portrait," says Larry Barton. "Above all, the finished work must be characteristic of that species. Although I hope my paintings are as accurate as possible, I would prefer to sacrifice technical detail to capture the *essence* of the subject."

Those who view Barton's bufflehead on the cover of this magazine, or the paintings which appear here, are not likely to argue with him. He has certainly captured that elusive essence, and it goes far beyond mere craftsmanship.

To many, Barton may seem like a newcomer, and in a sense, that's true. Born in Bad Axe, Michigan, in 1936, Barton studied at the Meinzinger Commercial Art School in Detroit and graduated from Murray State University in Kentucky in 1964. He then pursued a profession as editorial cartoonist for 16 years. His work appeared in the *New York Times, Washington Post, The Los Angeles Times, Detroit Free Press* and *Time Magazine,* but his longest stint was six years with the *Toledo Blade.*



Larry Barton abandoned a long career as a cartoonist to begin painting again four years ago. Already, he is recognized as one of the top outdoor artists in the country.

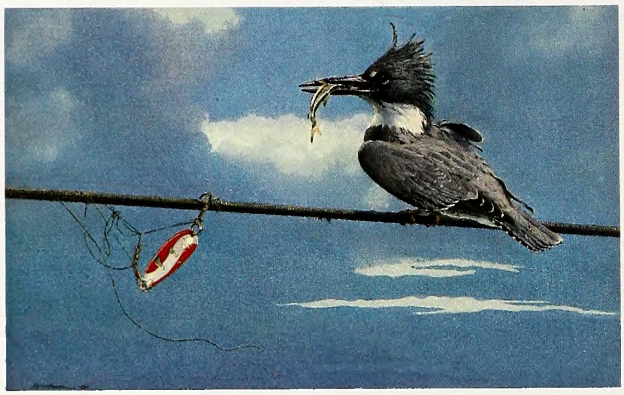
Summer Sanderlings
Transparent watercolor, 1981

"I can watch these little shorebirds for hours. They can sense when a breaking wave will reach them and when it will not. This may be the only subject I have painted that I can't trace back to my boyhood."

Barton's Daredevil

Transparent watercolor, 1981

"There was a utility line across the creek where I spent some summers, and I used to fish there along with the kingfishers. My first artificial lure was a Daredevil, and that line finally got it. It hung up there for years, and kids would point it out and say, 'Hey, there's Barton's Daredevil'."



Late Afternoon

Transparent watercolor, 1981

"This is an untypical approach to painting a cardinal, but when you think about it, it is a very typical scene. Cardinals often feed in very late afternoon, and they will look for food on the ground in crusty snow."

1981 (copyright Peterson Prints)

The Housewarming
Transparent watercolor, 1980

"If you'll notice the pecan tree, there are new shoots coming out of it because I had topped it before I hung the gourd. An ornithologist who saw the painting told me that bluebirds wouldn't nest in a gourd, but I think they might if it were firmly attached rather than swinging. Bluebirds looked at this one in my backyard, but chickadees actually nested in it."
1980 (copyright Peterson Prints)

"I moved my family — wife Jewell and four children, Jill, Scott, Eric and Phillip — to Pfafftown near Winston-Salem about nine years ago and we've been here ever since," says Barton. "In 1979, I decided to give up cartooning and go back to my first love. I've been painting ever since, mostly transparent watercolors."

Almost immediately, he took his place among the top wildlife artists in the nation, and his works have been exhibited at the Evansville Museum of Art Sciences in Evansville, the Eastern Waterfowl Festival, the Pavilion of Humor, Man and His World, Montreal, Quebec and the Winston-Salem Nature Science Center. Many of his works are in private collections, including the Hanes Collection in Winston-Salem. His works have appeared in *Ducks Unlimited* and other magazines. Two of his paintings appeared in the 1983 North Carolina Wildlife calendar.

Those interested in acquiring prints of Barton's work should write him in care of Shelburne Gallery, 4647 Highway 65, Pfafftown, N.C. 27040. Prints of some of his paintings, including those shown as copyrighted here, are available through Peterson Prints, 6725 Sunset Blvd., Los Angeles, California 90028.

Lesser Snow Geese

Gouache, 1980

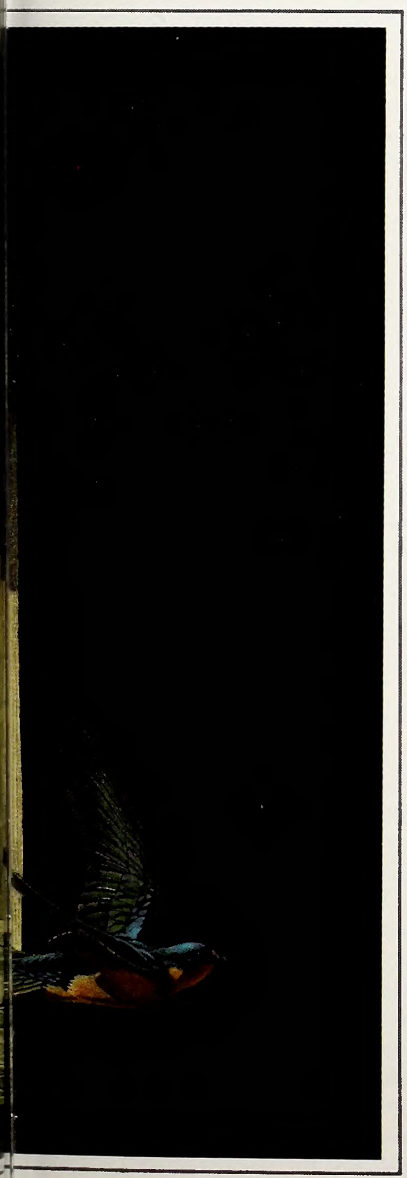
"I was trying to catch the last moments of light on the water when I painted this one, but I've since decided that I got it wrong. Everytime I see the water in this type of situation, it looks silver and any geese sitting on it would be pink. Maybe I'll try this again sometime."

Barnstorming

Transparent watercolor, 1980

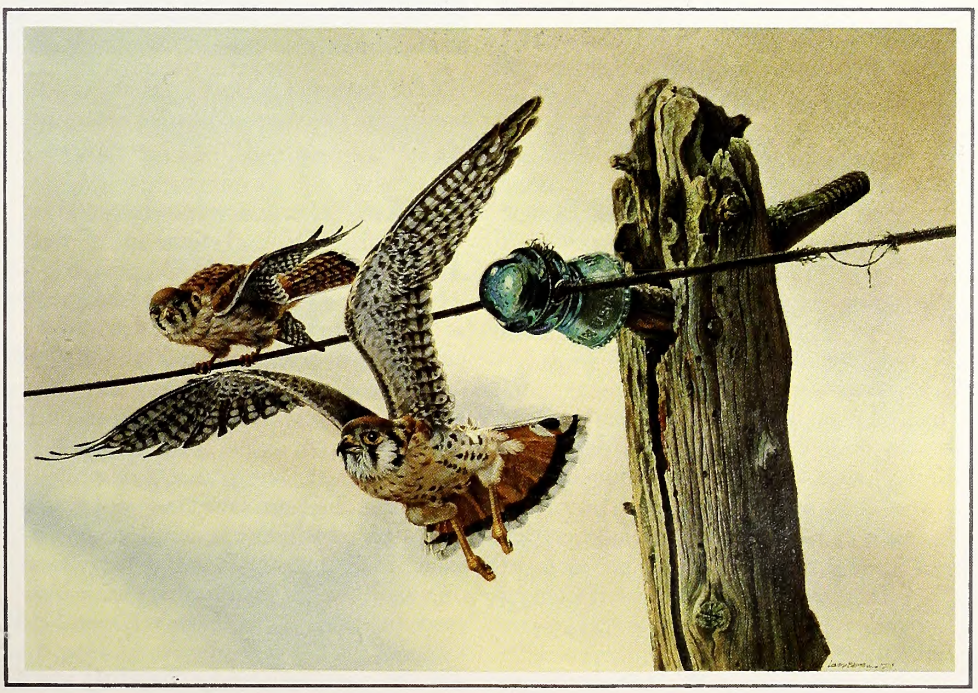
"There is an old building behind my house, and although I have never seen any barn swallows there before, I knew they would look just right in the light coming in that window. The idea kicked around for five years before I finally tried it, and I wound up taking the window out and bringing it into my studio so that I could paint it accurately."

1980 (copyright Peterson Prints).



Kestrels
Transparent watercolor, 1979

"This old utility pole had been abandoned in the woods behind my house, and I cut it down and brought it indoors. I added the blue insulator, and painted the sparrowhawks from study skins. I have also spent many hours watching these interesting birds."



Jay Hair Speaks Out

Some candid comments concerning the state of the environment by the Tar Heel head of the National Wildlife Federation, the nation's largest conservation group.

Wildlife Federation

Wildlife crusader Jay Hair, executive vice president of the National Wildlife Federation.

interview by Mark Taylor

North Carolinians can be proud to claim Dr. Jay Hair as one of their own. From 1977 through 1981, he served as a professor of zoology and forestry at N.C. State University. He was also prominent in conservation circles in North Carolina, and received the Governor's award as Conservationist of the Year in 1980.

In 1981, Dr. Hair moved to Washington to become the executive vice-president of the National Wildlife Federation. As leader of the nation's largest conservation organization, Dr. Hair has played a prominent role in the fight on Capitol Hill to retain the Clean Water Act, Clean Air Act, adequate funding for the EPA, and fair wilderness legislation. At a conference in Wilmington last fall, he shared his views about these and other subjects with Mark Taylor of *Wildlife In North Carolina.*

WINC: What impact would weakening or eliminating the Coastal Area Management Act (CAMA) have on coastal states?
JH: I think without question, CAMA or CAMA-like legislations have had a desirable impact. They allow coastal areas to proceed with development, but in a way that makes both economic and environmental sense. With the efforts now to weaken, or in some cases, eliminate the federal support for CAMA — or for state legislatures to weaken them — I think that we can see less opportunity for the public to be involved in the future of coastal zone areas. I think any effort to downgrade the intent of CAMA-like legislation is bad environmentally, but more important it's devastating economically because when you destroy the natural-resource base of these productive coastal areas you're ultimately going to destroy the economic base. That's why it's important to keep growth within the confines of responsible environmental protection. It doesn't mean no growth. It means responsible growth.

WINC: Let's talk about the National Wildlife Federation's stand on several issues. First, the move to weaken the Clean Air Act.
JH: The National Wildlife Federation has been the lead organization on the reauthorization of the Clean Air Act. It will include control of SO_2 emissions and acid rain controls. There are also other auto emission standards that we feel must be brought in line. We have supported the Mitchell-Stafford bill in the Senate which provides for 8 million tons reduction of SO_2 over the next decade. That's not what we ultimately need, but that's a responsible first step.

WINC: What about the move to weaken Section 404 of the Clean Water Act? (Editor's note: Section 404 prohibits the discharge of dredged or fill material into all U.S. waters without a permit.)
JH: I think Section 404, Clean Water, is going to be one of the great challenges for us in Congress. I've gone on the record for Congress, and I'd go on record for anybody, saying that wetlands are the single most important type of habitat anywhere in the world. They're the most important economically and environmentally, and that's the thing that folks have a hard time understanding. They're important for filtering out various

kinds of environmental pollutants, flood control, and many other things. Economically, coastal wetlands like those here in North Carolina are important to commercial fisheries — shell and finfish. They're also important for sport fishing.

WINC: We're losing many of these wetlands through conversion to agricultural lands and peat mining. Could you address those problems?
JH: Nationwide we know from Department of Interior reports that we're losing somewhere in the neighborhood of 300,000 acres of wetlands a year to various kinds of conversion activities. I have two concerns about the loss of wetlands in North Carolina. First, we must not take the attitude that all coastal wetland development is bad because in some cases it is necessary to provide for other economic growth activities. But I am very concerned about the massive and very rapid rate at which we are losing the coastlands, especially through peat mining, or whatever kind of fuel production that might generate from that. I consider that a dubious venture. I am concerned that North Carolina agriculture is going to be drastically altered by these megafarms. Large industrial corporations — because of their massive ability to drain the wetlands from horizon to horizon — can gain a far superior competitive advantage over folks who are the traditional agricultural producers in North Carolina. I think that's bad. Small family farms can be lost. I think good sensible planning and a good, strong effective Coastal Area Management Act should not allow those kinds of activities to happen. Then, of course, I'm concerned that massive drainage of coastal wetlands, desalinization of the sounds and all the impacts there on shellfish are just dumb economic tradeoffs. It's shortsighted and I think we ought to resist that.

WINC: What about wilderness legislation?
JH: As you may recall, on one Sunday television show, Interior Secretary James Watt made a rather dramatic announcement that he was going to have a wilderness protection bill that would lock up the wilderness until the year 2000. Some of the environmental groups — but not the National Wildlife Federation — rushed to commend him for doing that. When we were asked our opinion, we said we wouldn't make an opinion until we saw the draft legislation.
Unfortunately, but not to my surprise, when we looked at the draft legislation, we found that it was not a wilderness protection bill, but a wilderness destruction bill. It provided that in the year 2000, the wilderness system as we now know it would, in essence, be abolished. When this came to light, several members of Congress and the House took the initiative to introduce a true wilderness protection bill which passed overwhelmingly. When you get that kind of legislation passed by that kind of a margin, you know that the folks in Congress have heard from their constituents back home.

WINC: How have the members of the National Wildlife Federation responded to Secretary Watt?
JH: Secretary Watt has made a great effort to divide the conservation movement into what he calls elitists — preservationists, sometimes referred to as tree huggers — as opposed to true, real conservationists, sportsmen, people who utilize the resources. Well, what makes his argument ring rather hollow is an organization like the National Wildlife Federation which has over 4 million members, many of whom hunt and fish, but many of whom are just concerned about good environmental protection.

WINC: What has been the effect of transferring some federal fish and wildlife programs back to the states?
JH: I think a lot of us initially thought that the ideas of transferring programs from federal to state and local levels was a good idea. In principle, it is still a good idea. The problem is that it is not only a transfer of authority, but also an abandonment of principles. It is totally unreasonable to expect the states to pick up these programs at the state level when they haven't done it traditionally. And they haven't done it traditionally primarily because they have not had the financial resources to do it. This is irresponsible, and will affect state programs. Sportsmen and environmentalists are beginning to realize this.

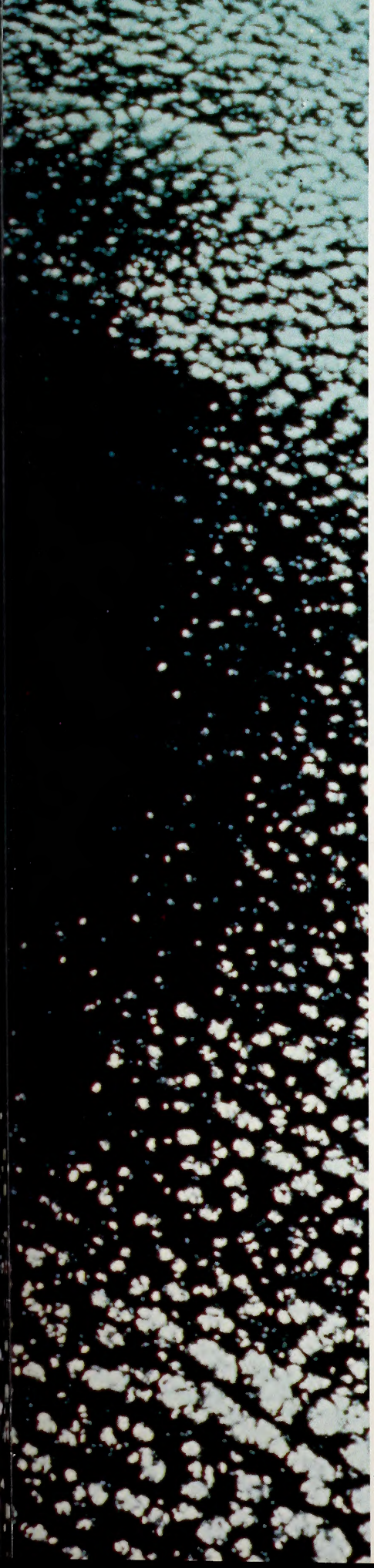
WINC: How has the conservation movement changed in recent years?
JH: I think Americans have begun to wonder about those values in life that they thought were protected, that ensured them a healthy environment free from pollution, free from toxic waste, the Love Canals. Those expectations are eroding systematically, slowly but surely. The impression has been made that somehow saving the environment is costing jobs, yet all the data says just the opposite. Environmental protection creates jobs just as we have created a whole industry to clean up or to cool the air in this room. For example, we have created a whole industry to clean up the air from the smoke stacks.

WINC: What do you consider to be the most critical conservation program for the citizens of North Carolina and nationally?
JH: I think the most important conservation program for North Carolina and this nation is to have a healthy economy. The reason I say this is that only when we have had a healthy economy can we truly put into perspective the importance of environmental protection. More specifically in terms of legislation, I think the number one national priority has to be the reauthorization of a strong Clean Air Act.

In North Carolina, I think probably the biggest issue in the next decade is going to be improving programs to enhance the quality of water. I think the other biggest challenge that this State faces is how do we bring on line further economic development and attract to this state those kinds of industries that are diversified — that will sustain our economic base. But, at the same time, this industry must not be the kind that will continually have strong negative impacts on the environment.

WINC: Having come from North Carolina and gone to Washington to become leader of the nation's most powerful conservation organizaton, how has your perspective on North Carolina changed?
JH: I guess now that I've gone to Washington and had a chance to travel all across the country literally from Alaska to Florida, from New Hampshire to Mexico, I've had a chance to really appreciate North Carolina's unique diversity of natural resources. I also have a greater appreciation for some of the opportunities now for North Carolina to really do it right. I see absolutely no rationale, no support for massive economic development, if you ultimately destroy the natural resource amenities.

I think the main key to North Carolina's future is what we're doing right here today, and that is making sure we have informed and involved citizens. That's the key. That's what makes government work, and that's what makes the process work. Appropriate and responsible involvement involves the process of educating people in an objective manner about what the consequences are, what the tradeoffs are. How we involve the public in making the right decisions is the real challenge.



CAMA
NINE YEARS LATER

The Coastal Area Management Act has been praised and cursed, but it has done its job fairly well. Now, nine years after its birth, it faces a financial crunch.

by Mark Taylor

Offshore oil development. Condos. Destruction of wetlands. Peat mining. Second-home development on barrier beaches. Access to public waters.

Life along the coast is complicated these days, and many Tar Heels are haunted by a familiar question: how can we preserve the quality of coastal life in a changing world? There is a program that addresses these issues, but since it was launched in 1974 the Coastal Area Management Act — or CAMA — has weathered some stormy seas. CAMA seeks to provide orderly development in coastal areas while protecting important natural resources. Supporters praise the program as a far-reaching piece of legislation, while developers say that CAMA ties their hands in red tape. Even environmentalists, while supporting CAMA's basic thrust, have attacked the program for not going far enough. In 1976 emotions ran so high that police were needed to maintain order at some public hearings dealing with CAMA.

Opinions of the program are changing, however. At a similar round of public hearings in the fall of 1982, 142 out of 150 speakers — including some developers — expressed support for CAMA. Smoother waters may lie ahead, but one more storm looms on the horizon. This term, the CAMA program comes up for budget review before the 1983 North Carolina General Assembly. Conservationists are hoping it will survive, for CAMA, they believe, is one of the coast's best friends.

To understand just how important CAMA has been, you have to go back a couple of decades to see what it addressed. Prior to the late 1960s, the State had little authority to manage development in coastal areas. People could do essentially what they wanted. If they decided to fill in a salt marsh or build a house on the beach, there was little to stop them.

The legacy of this policy was polluted shellfishing areas, unsafe beachfront developments, ditched and drained salt marshes, and other ills. However, environmental consciousness began to surge in the late 1960s, and in 1969 North Carolina adopted its first Dredge-and-Fill permit law protecting coastal wetlands.

Soon, citizens were questioning other

Barrier Island Arc: CAMA *was designed to regulate development in areas of environmental concern in sounds, estuaries, wetlands, barrier islands and beaches, many of which are visible in this photograph from Apollo 9.*

NASA

coastal developments. The federal Coastal Zone Management Act (CZMA) was designed to regulate development in environmentally sensitive coastal areas, and in 1974 — after a long and bitter struggle in the legislature — North Carolina adopted CAMA, 80 percent of whose funding comes from CZMA monies. This program covered the 20 coastal counties of Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hertford, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell and Washington. The Office of Coastal Management in the Department of Natural Resources and Community Development administers CAMA, and a 15-member Coastal Resources Commission sets policy for the program. These commissioners are appointed by the Governor, largely from local government nominations, and members represent commercial and sport fishing, agricultural, development, wildlife, forestry and conservation interests.

CAMA is unique to North Carolina and its success isn't matched in too many other states. It approaches natural-resource management from a regional perspective, and recognizes that coastal areas have a significance which spreads far beyond local and even state boundaries. The CAMA program has two parts — regional land-use planning, and the issuance and review of permits for any development in environmentally sensitive coastal areas.

"The permit program may be the most visible and controversial part of CAMA," said David Owens, assistant director of the Office of Coastal Resources, "because when someone is denied a permit, he often becomes upset. We try to work with permit applicants to modify their projects during the application period so that natural resources are protected and the applicants are able to continue with their projects."

Not all areas in coastal counties are covered in the permit program. Indeed, the program recognizes that certain valuable natural areas are sensitive to disturbance and should be protected. These are called "areas of environmental concern" — or AECs — and include portions of barrier beaches, wetlands, and coastal waters. No development can take place in an AEC without a CAMA permit.

"Typically, development issues in AECs vary," said Owens. "In 'ocean-hazard areas' on barrier beaches, the big issue is the construction of beach front homes. Due to a rise in sea level that is averaging about one foot per century, North Carolina's beaches are eroding and migrating landward. Consequently, beach erosion is a serious problem in some areas — especially near inlets. Development in these areas — if it occurs at all — should be done in a way that maintains the natural character of the beach, and protects life and property."

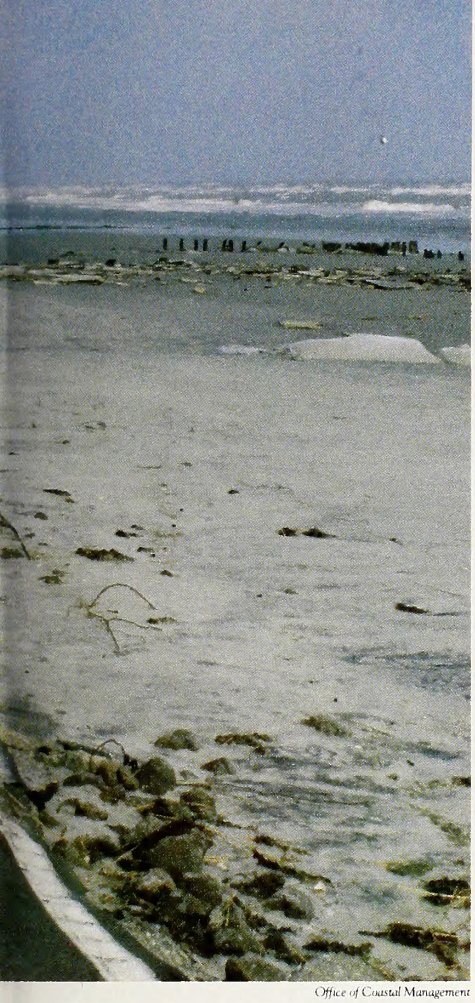
A CAMA permit for development in "ocean-hazard areas" stipulates that the structure be set back from the high-tide mark, restricting development to the stable, landward side of the barrier island. It also requires that houses be built to withstand a 100-year storm — one like Hurricane Hazel, which caused severe damage when it struck the North Carolina coast in 1954.

"The set-back requirement maintains the integrity of the beach system," said Owens. "A barrier is really a complicated ecosystem, and the beach and frontal dune are constantly shifting as they absorb the energy of the sea. When this system is altered, serious erosion problems may result — and expensive seawalls, jetties and beach-nourishment projects are only temporary solutions. The minimum set-back requirement, whose distance varies from beach to beach, depending on the geologic character of the site, allows the beach to function naturally. Since major storms are inevitable, requiring homes to be built so that they may weather a major hurricane will also save lives and property."

Many permits involve developments affecting wetlands, probably North Carolina's most valuable natural areas. In fact, about 90 percent of the fish and shellfish landed in the State are dependent upon wetlands at some stage of their lives. With 4,500 square miles of wetlands, North Carolina ranks second only to Louisiana in the lower 48 states in wetland acreage. Large-scale destruction of coastal marshes, by and large, has stopped. Yet, wetland are still lost to small "Mom and Pop" projects that whittle away at remaining areas.

"Many of the projects that destroy wetlands are small," said John Parker, permit coordinator for CAMA. "It's often difficult to make people see that their small project has an adverse impact on the environment. Here is a typical example. A man has a mosquito-control ditch on his property where he'd like to keep a fishing boat. The ditch has become clogged with vegetation, and he'd like to clear and widen and deepen the channel.

"Right away there are problems. The aquatic vegetation and bottom serve as a nursery for shrimp, other shellfish and young fish. And the spoil from the project



Office of Coastal Management

End of the Road: *Hurricane David washed away this road near Shallotte in 1979. For coastal areas, hurricanes and severe storms are facts of life. Under CAMA regulations new construction in ocean hazard areas must be built to survive a 100-year hurricane, one like Hurricane Hazel which shivered the timbers of many coastal buildings in 1954.*

would be dumped on the marsh — eliminating valuable habitat for shore birds, waterfowl and other wildlife."

In this case, the solution was not to channelize the canal, but to widen and deepen the canal along the bank where the original spoil had been placed, and to deposit new spoil on top of the existing spoil. This preserved the marsh, maintained estuarine shellfish habitat, and allowed the applicant to use his boat.

"Our number one priority in wetlands is the preservation of habitat," said Parker. "These areas are public waters, and are vital to commercial fishermen, sport fishing and wildlife — so no one has a vested 'right' to alter them. However, projects can often be modified so that the applicant is satisfied and the environment is protected."

Another key part of CAMA's permit program is the review of federal projects in

Office of Coastal Management

Trailer Hive: *Trailer park at Topsail Beach was created by dredging deep canals into the existing salt marsh and using the mud spoil to make high ground. The marsh was destroyed and septic tank drainage and other severe water-quality problems plague developments like these today. CAMA regulates new construction in an area of environmental concern like a marsh.*

Bruce Craven

The Good Life: *Houses built in front of the dunes would not be permitted under current CAMA standards. Coastal areas are subject to the relentless force of beach erosion and wave action has caused beaches to migrate inland, undermining structures or requiring them to be moved. CAMA now stipulates that new-house construction take place at least 60 feet behind the vegetation line.*

Steve Benton

Crankcase Carnage: *Shoreline erosion is a serious problem for property owners along estuaries. CAMA permits the construction of certain kinds of bulkheads which are effective at holding back erosion, but this line of scrapped cars looks bad and doesn't do the job.*

Steve Benton

Old Tires: *Estuarine waters are valuable. "Mom and Pop" violations like these old tires placed to stop shoreline erosion are not major problems, but the cumulative impacts of many small violations may be. CAMA officials met with the owner of this property and the tires were removed.*

Helping Themselves: *Through land-use plans, the 20 coastal counties and interested municipalities can categorize their lands according to uses that fit local conditions. Such plans help counties keep development from spilling over into important natural areas. Areas designated "rural," (far right) for example, maintain agricultural or timber uses. Carteret County reclassified Radio Island (near right), off Morehead City, as "rural-port" and plans for a large-scale coal export facility on the island were dropped as a result.*

Preston Pate

Steve Benton

Public Participation: *CAMA's regulatory and advisory bodies are manned by coastal county residents and state officials. The 15 members of the Coastal Resources Commission (CRC) set CAMA's policies and regulations and are advised by the 47-member Coastal Resources Advisory Council (CRAC). The Office of Coastal Management, in the Department of Natural Resources and Community Development (NRCD), administers the CRC's regulatory decisions. Paul Denison speaks at a 1981 CRAC meeting (right) while Cecil Sewell and others listen.*

Jim Page

the coastal area, one of which ultimately led to one of North Carolina's biggest fights with the federal government: the proposed leasing of offshore oil tracts near the coast.

"A provision of the federal Coastal Zone Management Act is that any federal action taken within the coastal zone must conform to a state's coastal management plan," said Owens. "In this case, several tracts slated for offshore oil leasing created unacceptable risks to the North Carolina coast. Ultimately, the case went to a federal court, and eventually (Interior) Secretary (James) Watt removed the controversial tracts from the leasing program."

The second key to the CAMA program, and perhaps its greatest accomplishment, is the development of comprehensive land-use plans in the 20 coastal counties. All counties must develop land-use plans which include a data summary of existing resources, policy discussion, and a land-use map which divides land into a number of categories depending on use.

"Land-use planning really accomplishes two things," said John Crew, a CAMA planner from Washington. "It allows counties and municipalities to take stock of their resources. And it gives them the means to determine what they would like their area to be like in the future."

Under the provisions of the original CAMA legislation, counties had until 1976 to develop approved land-use plans, and communities had the option to prepare their own plans. Before CAMA, only four of the coastal counties and seven municipalities had land-use plans. In 1976, all 20 counties had approved plans, and currently an additional 50 municipalities within the coastal region have adopted land-use plans. CAMA also requires that these plans be updated every five years.

Crew offers some examples of how land-use planning can benefit an area. "If agriculture is important to the local economy, farm lands can be protected under the land-use plans and provisions can be made restricting development of these areas. A similar situation occurs with natural areas. Pocosins could be classified as conservation areas, and development would not be allowed — yet the areas would be available for fishing, hunting and other recreation. Development can also be steered to where it will do the least damage, and where municipal services — like water and sewer lines — are readily available. This planning will reduce the costs of government services, and will ultimately result in a better place to live.

"Of course, the development of an area is only as sound as its land-use plan. For example, the construction of condominiums on beaches is a hot issue now. If these developments don't fall within an 'ocean-hazard' area, the only restrictions are dependent upon the local land-use plan. Development will occur whether we like it or not — and this development will be as good, or as bad, as the local government makes it."

The Office of Coastal Management is also involved in three other areas related to CAMA: a beach-access program, an estuarine sanctuary system, and a coastal energy impact program. The beach-access program is designed to improve public access to beaches and coastal waters. The estuarine sanctuary system protects key natural areas for education and research. The coastal energy impact program studies the effects of proposed energy development along the coast.

Critics of CAMA have accused it of doing either too much or too little. "The question is not the concept of CAMA," says State Senator Melvin Daniels (D-Pasquotank), a frequent critic of the program, "but the question of who will be setting the course of our future. The concept is good and noble, to protect fish and wildlife and the coastal ecology. But we don't want the folks in Raleigh to be setting policy down here for us. Basically, we want more local input." He also complains that CAMA discriminates

Steve Benton

Next? *Peat mining and large-scale farming operations may threaten fish and shellfish nursery areas in estuaries. Critics have pointed out that* CAMA *regulations now exempt agricultural activities and peat mining, and some legislators have moved that these activities be brought under* CAMA.

against the 20 counties covered in the program. "There are environmental problems across the State," he says.

David Owens responds by saying that local representation has been built into CAMA. Of the 15 members on the Coastal Resources Commission, he says, 13 are coastal county residents. And most members of the 47-member Coastal Resources Advisory Council (CRAC), which advises the CRC, are coastal county residents as well. "All policy plans are made by local officials as part of their land-use plans," he says.

Environmentalists have criticized CAMA for not doing enough. They look askance at its low permit-denial rate — in the last two years only about four percent of all permit applications have been denied. David Owens contends that this low denial rate is actually one of CAMA's biggest successes.

"Our whole system is designed to have pre-application counselling," he said. "The Office of Coastal Management has four field offices in coastal North Carolina which handle these permits. When someone requests a permit, a representative from the field office meets the applicant at the project site to discuss the permit. This allows us to make suggestions for modifications to the project before the application is filed. Often, only minor changes are needed to make a project acceptable. This on-site visit reduces the denial rate considerably. If we were totally successful, we wouldn't have any denials."

In effect, the CAMA program streamlines the permit process. A CAMA permit in an AEC satisfies five state and federal permits, defusing another charge that the CAMA permit program is unwieldy. In fact, the average time span for processing a CAMA permit for a minor project — a single-dwelling home on a barrier beach, for example — is 18 days.

Derb Carter, director of the Carolina Wetlands Project, an affiliate of the National Wildlife Federation, expresses another frequent criticism of the program.

"CAMA's biggest strength is that it provides a framework for comprehensive planning in the coastal zone," he says. "The program has done an excellent job in controlling oceanfront development on barrier beaches. However, I feel that the most significant weakness of CAMA in North Carolina has been its inability or unwillingness to address the big issues affecting estuarine systems — including massive land-clearing and drainage projects for superfarms, forestry operations, and peat mining."

Says Owen: "Derb is talking about large land developments in pocosins, which are freshwater wetlands that aren't covered by CAMA. However, secondary impacts of development in pocosins do affect coastal marshes and estuaries. Our main work is with development within coastal wetlands, and I think Derb would agree that we've done a good job in this area. But when it comes to secondary impacts we haven't gotten as much involved as yet. The problems are more difficult and harder to solve. Non-point pollution, for example; there's a lot of disagreement and uncertainty on how to deal with this problem. It's not a black and white issue."

What does the future hold for CAMA? Not long ago the smart money was on its demise. But with public hearings on the coast showing overwhelming public support for the program, and with Senator Daniels' own 12-member legislative study committee recommending only minor changes — "Practically nothing," he complains — CAMA may have a more sympathetic hearing before the General Assembly.

The outlook is still not bright. President Ronald Reagan insists that the Coastal Zone Management Act, which has been funding 80 percent of CAMA's budgets, is a fine act, but says that the states should pay all of the costs for land-use planning and coastal management. In addition there is a possibility he would veto a bill that would fund CAMA — and other coastal programs — with revenues from the leasing of offshore oil and gas tracts.

This means that the General Assembly will have to appropriate most of the $1.2 million CAMA budget for fiscal year 1983-84 if the program is to be saved. In spite of their past criticism, environmentalists and others have closed ranks behind CAMA. At a recent coastal conference sponsored by the Sierra Club and the National Wildlife Federation, all major state conservation organizations expressed support for CAMA.

As Derb Carter says: "Overall we're strongly in favor of CAMA. If the state wants to maintain the special natural values found on our coast — including clean water, sport and commercial fishing, recreation, abundant wildlife, and a host of others — maintaining a strong CAMA program is critically important." ⏢

Symbols Of The State

Wildlife Species are part of a rather long list of State symbols that officially represent North Carolina's outdoor heritage.

by Lawrence S. Earley

Did you know there is an official State Toast in North Carolina? Here's the first verse:

Here's to the land of the long-leaf pine,
The summer land where the sun doth shine
Where the weak grow strong and the strong grow great,
Here's to "Down Home," the Old North State!

We also have a State motto ("Esse Quam Videri" — To Be, Not To Seem), State colors (red and blue), a state song ("The Old North State") and a State rock (granite).

North Carolina is so proud of its many natural resources, it is not surprising that through the years the N.C. General Assembly has also adopted many other species as State symbols. The Old North State has chosen a bird, a tree, a mineral, a reptile, a salt water fish, a mammal and an insect. Duane Raver's painting on the following page contains them all.

The State Flower

After a cold, bitter winter who doesn't rejoice to see the first delicate blooms of flowering dogwood appear in the woods? Together with other early bloomers such as the redbud and daffodil, the dogwood hints at the explosion of spring color to come and puts gladness in our hearts. The red berries appearing in autumn are a source of food for birds and other animals. The close-grained and hard wood was used at one time to make shuttles in textile mills. (Chosen in 1941.)

The State Bird

The cardinal is the State Bird. With its fire-engine dress, the male stands out easily among the birds at winter feeders, although the duller-colored orange billed female is no less handsome. The cardinal nests in bushes, trees or vines, usually not more than 3 to 15 feet high, and may produce three or four eggs two or three times a season. The female usually incubates the eggs, although the male may do so from time to time. These pretty birds favor trees along the edges of fields and backyard trees and bushes. (Chosen in 1943.)

The State Tree

The pine is the State Tree. It is one of the most common trees in North Carolina and also one of the most useful. There are many kinds of pines in the State, including the short leaf, loblolly and long leaf pines. Once vast stands of virgin long leaf pines supplied masts for sailing ships, naval stores — turpentine, tar and resin — and timber. The tough and durable wood from pines is still used in many kinds of construction. (Chosen in 1963.)

The State Shell

The Scotch Bonnet is the State Shell. Is is a lovely and graceful shell, 2 to 4 inches high, and is usually found in offshore waters 200 to 500 feet deep. (Chosen in 1965.)

The State Mammal

The eastern gray squirrel is the State Mammal. It is a common inhabitant of hardwood forests, although gray squirrels take easily to backyards. Nuts and fruits provide a large part of the squirrel's diet. It nests in tree holes or builds leaf nests about 25 feet above the ground. It breeds twice a year, usually producing three to five blind and hairless babies each time. (Chosen in 1969.)

The State Salt Water Fish

The channel bass, or red drum, is the State Fish. It occurs in great numbers along the coast. Some weigh as much as 90 pounds or more, but they average 30 to 40 pounds. Channel bass are bottom feeders and provide great sport for surfcasters using live baits such as clams, crabs and cut mullet, as well as artificial lures. (Chosen in 1971).

The State Precious Stone

The emerald is the State gemstone, and these valuable stones occur in a variety of places across North Carolina. The town of Hiddenite, near Statesville, produced the largest emerald in the State, a 1,438-carat specimen. Another, called the "Carolina Emerald" became the largest cut emerald in the United States and was valued at over $100,000. (Chosen in 1973.)

The State Insect

North Carolina's State Insect is the honey bee, one of the most valuable insects in the State. Not only do honey bees produce millions of dollars worth of honey per year, but they pollinate many of the State's most important crops, including tobacco. When the bee climbs into a flower, pollen sticks to the bee's body hairs and is combed onto the legs of the bee for transport back to the hive. Honey bees are social insects, living in man-made hives for the most part. (Chosen in 1973.)

The State Reptile

The Eastern box turtle is the State Reptile. The box turtle is found throughout the State in forested areas. Mostly terrestrial, it will crawl into water on hot days to cool down. Turtles eat harmful insects among many other things. The female lays from three to eight eggs in summer, and the young hatch about 90 days later. (Chosen in 1979). ⟐

D. RAVER

A Battle With No Winners

Written and Edited by Mark Taylor

There were all the classic elements of a confrontation. On one hand, hunters with air boats and half-tracked swamp buggies. On the other side was Cleveland Amory and his Fund for Animals. Highlighting the occasion was the national media. And the issue was the Florida Everglades deer herd.

The flurry of publicity and lawsuits surrounding the Everglades deer hunt last summer put wildlife management on the evening news — in a very unflattering way. The proposal? An emergency hunt to thin deer herds in two flooded state wildlife management areas in the Florida Everglades. The Fund for Animals, and other humane groups, quickly gained national media attention and sympathy by calling the hunt a "slaughter." It wasn't that simple.

Flooding is a fact of life in the Everglades, and periodic die-offs of deer occur when the animals are isolated on small islands of habitat and most of their food supply is underwater. This was the situation last summer. Two major tropical storms had water levels rising rapidly, and all vehicular traffic had been prohibited to reduce stress on the deer herds. Based on past studies, Florida wildlife officials knew they could expect a severe die-off and habitat damage if something wasn't done. A similar situation occurred in 1978-79, and a majority of the deer in the flooded area had died of starvation. Overfeeding had also caused severe damage to the vegetation.

Florida wildlife officials decided to hold an emergency hunt — 2,200 animals would be removed from the flooded areas. An adequate food supply would remain for the thinned herds, and the habitat would not be destroyed by over-feeding. The smaller herds would come through the flooding in good health, and high reproductive rates would allow the deer to recover rapidly. This was based on past experience. An emergency hunt in a similar flooded area a few years previously had removed 600 deer, and the remaining herd had showed no mortality.

However, a local humane organization quickly filed suit, charging that the hunt was a "slaughter." It would be a simple matter, the group argued, to feed the deer. An injunction was granted, and the hunt was stopped.

The humane group chose to ignore past history. Wildlife officials had tried massive supplemental feeding programs for deer stranded by flooding in 1958, 1960, 1966, 1968 and 1970. The logistics of locating and feeding the deer had been insuperable. Also, biologists found that the abrupt change in the diets of the animals didn't allow the deer enough time to develop the micro-organisms essential to their digestive process. By the time the deer had adapted to their artificial diets, most had died of starvation, disease or stress.

Enter Cleveland Amory and his Fund for Animals. Amory's lawyers filed a flurry of ill-founded suits (none of them held up in court), and gained national attention. The solution to the problem? Amory and his supporters would rescue the deer and move them to better habitat. Once again, past history was ignored. The Florida Game and Fresh Water Fish Commission had attempted this in the past, and relocation efforts had been dismal failures. Many weakened and

Florida Game & Fresh Water Fish Commission

In The Limelight: *Humane groups — claiming that last summer's Florida Everglades emergency deer hunt was a slaughter — quickly gained sympathy from the national media. However, wildlife officials knew from past experience that a controlled hunt was the only practical alternative to letting large numbers of deer starve in the flooded areas.*

Florida Game & Fresh Water Fish Commission

A Futile Attempt: *Efforts to rescue and relocate deer in the flooded Everglades received widespread attention — yet these attempts were dismal failures. Only 18 deer were rescued, and most of these died later from stress incurred during the capture.*

diseased deer died from the stress of capture. Often, deer that were relocated to higher ground returned to their flooded home ranges. However, a judge granted an injunction against the hunt while the rescue took place.

Amory had claimed that he would have 90 volunteers with air boats available the first day, and confidently added that an average of 250 deer could be relocated per day. The 2,000 deer would be relocated in eight days — ending the problem. On the first day, seven volunteers with air boats showed up — and rescued a total of 14 deer. On the second day, only three volunteers with air boats were present — and four deer were moved.

The courts quickly allowed the emergency hunt to take place in one of the wildlife management areas — and hunters killed 723 deer. Later biologists monitored the herd and found that mortality in the remaining animals was 23 percent and little damage was done to the habitat. The deer herd would soon recover. In the other flooded area, the hunt had to be cancelled because of the legal delays. Mortality in this deer herd topped 65 percent, and habitat damage was severe. Because food was so scarce, biologists even noted cannibalism in wild dogs.

There were no winners in the confrontation in the Everglades, except, perhaps, Cleveland Amory who gained additional celebrity from the national media. There were some clear losers, though — the deer that slowly died of starvation in the flooded swamps of the Everglades.

— *Florida Wildlife*

Are Food Plots The Answer?

"Ask A Biologist" is a series of articles on wildlife management that appears regularly in *Wildlife In North Carolina.* The author is Carl Betsill, a Wildlife Commission biologist who specializes in the management of small game and urban wildlife.

Question: I would like to increase the quail population on my farm. I recently learned that the Wildlife Commission gives seed to anyone interested in planting wildlife food plots. Is this the answer to increasing quail numbers?

One of the Wildlife Commission's most popular programs is the distribution of free seed for wildlife food plots. Over 40,000 units of free wildlife seed are distributed annually on a first come, first served basis. The program has its drawbacks, however. Many people assume that since the Wildlife Commission is giving away seed, this must be the answer to problems with low small-game populations. The situation isn't that simple.

Unfortunately, food is only one of many factors that limit wildlife populations. All wildlife depend on a variety of factors for survival. Quail, for example, need escape cover, specific kinds of nesting sites, areas where chicks can forage for insects, as well as an adequate winter food supply. If any of these factors is in short supply, attempts to increase the quail population by improving one of the other factors will be futile. In other words, there is no point in increasing the winter food supply if there is a lack of escape cover.

It's hard to say how often food is the limiting factor for quail populations, because many people overlook the importance of native plants in a quail's diet. Common plants like ragweed, begger weed, oaks, pines, sumacs, dogwoods, sweetgum and panic grasses are all major foods for quail. In at least half of the instances across the State, most biologists would agree that some factor other than food is limiting quail populations.

However, there are benefits to planting wildlife food plots other than improving the habitat. Food plots draw wildlife into areas where they are visible — and easily watched. Also, these areas are more accessible to the hunter.

How, then, does one decide if planting a food plot would be beneficial? Begin by looking at the habitat. If there are windrows, idle fields, one- or two-year old cut-overs, or corn or soybean stubble left in fields, then some factor other than food is probably limiting the quail population. In other cases, try using the process of elimination. Try planting some food plots; and if that doesn't seem to work, strips of serecia or lespedeza for cover may be necessary.

In many cases, finding the limiting factor can be a tough problem. However, the Wildlife Commission has wildlife biologists in every district of the State who will be glad to work with you. These biologists have the training and experience to spot problems, and will often be able to determine the limiting factor quickly. The name and address of the biologist in your area may be obtained from a local wildlife enforcement officer, or call the Wildlife Commission's toll free Wildlife Watch hotline: 1-800-662-7137.

Best Paper

Three fishery biologists with the Wildlife Commission were recently honored for presenting the best scientific paper to the southern division of the American Fishery Society. The meeting was held in conjunction with the annual meeting of the Southeastern Association of Fish and Wildlife Agencies.

Richard Guier, Lacy Nichols and Robert Rachels were honored for their scientific paper entitled "Biological Investigation of Flathead Catfish in the Cape Fear River."

The three biologists have been heavily involved in the successful introduction of this fine trophy fish in the Cape Fear River basin. Flathead "cats" weighing over 30 pounds are regularly caught in the Cape Fear River.

Gobbler Gathering

Turkey hunters should mark March 19 on their calendars. On that Saturday, the North Carolina Wild Turkey Federation will hold its annual meeting at the Kerr Scott Building at the State Fairgrounds in Raleigh.

The day-long event will feature a calling contest, seminars, displays, lectures and other events. Many well-known exhibitors will feature equipment for turkey hunting, and will offer advice on improving your hunting.

For more information, contact the North Carolina Wild Turkey Federation, 33 Southwick Drive, Arden, N.C. 28704.

Public Lands — A National Treasure

Picture 740 million acres of land, an area about the size of India, the seventh largest nation on earth. That's one-third of America's land — and that's what is owned and maintained for all American citizens in the form of public lands.

National Wildlife Week will be observed from March 20-26 this year, and the theme is "This Is Your Land — Public Lands Belong To All Of Us."

"Our rich legacy of public lands includes national forests, parks, seashores, historic sites, wildlife refuges, wilderness and many other areas," said Dr. Jay Hair, executive vice-president of the National Wildlife Federation. "These areas offer outstanding outdoor recreation, an abundance of natural resources, spectacular scenery, and plentiful wildlife. National Wildlife Week will celebrate these values, and emphasize that our public lands are maintained for all of our citizens to use and enjoy.

"However, our nation's growing population and increased demands for natural resources have greatly intensified the need to manage our public lands effectively. The more we learn about these areas, the more fully we can enjoy their benefits and actively contribute to their wise management."

America has a rich legacy of public lands. Our first national park — Yellowstone — was established in 1872, long before western Wyoming and Montana were settled. Still, a forward-thinking Congress reserved the wild Yellowstone area as a "public park or pleasure-ground for the benefit and enjoyment of the people." Later administrations reserved additional public lands. President Theodore Roosevelt — one of our great conservationists — placed nearly 230 million acres in public lands while president. Today, there are national wildlife refuges in 49 states, and national parks in 24 states.

"As one of our great conservationists, Teddy Roosevelt recognized the value of public lands — not only for their untold wealth of natural resources, but also for their unique beauty and importance as wildlife habitat," said Hair. "As we make decisions affecting the futures of these areas, we would do well to remember a statement that Teddy Roosevelt made while building our system of public lands. He said 'We are not building this country for a day. It is to last through the ages'."

Posters and educational kits on public lands are available from the National Wildlife Federation, National Wildlife Week, 1412 16th Street, N.W., Washington, D.C. 20036.

Wildlife Federation

Celebrate National Wildlife Week: *"Public Lands Belong To Us All" is the theme for National Wildlife Week, which will be observed from March 20-26. Almost one-third of the land in the United States is in public ownership.*

Outstanding Officer Named
Top Hand

Joe Newman of Southport was recently honored as "Wildlife Officer of the Year" for North Carolina at the annual meeting of the Southeastern Association of Fish and Wildlife Agencies in Gainesville, Florida. Each state honors an outstanding wildlife officer.

"Joe is an exceptionally fine officer and a fine man," said Gene Abernethy, chief of the Wildlife Commission's Division of Enforcement. "In addition to his other duties, he has been heavily involved with the endangered sea turtle project. His commitment to wildlife conservation is very strong, and shows in his work."

Newman began his career with the Wildlife Commission in 1969, and has served in Southport since that time.

Dixie Deer Classic

Deer hunters take note — the Dixie Deer Classic will be held on March 11-12 at the North Carolina State Fairgrounds in Raleigh. On Friday, the event will run from 5-9 p.m., and on Saturday the event will run from 9 a.m. through 6 p.m. Sponsored by the Wake County Wildlife Club, the event is a competition to determine the best deer taken in the State in different categories.

A wide variety of sporting goods and hunting equipment will be exhibited, and special guest speakers include Leonard Lee Rue, a nationally known wildlife photographer and outdoor writer, David Morris, editor of *Carolina Game and Fish* magazine, and others.

A Matter Of Degrees

Place a venison roast or a plucked goose in the hands of many otherwise competent cooks, and as often as not you are faced with a quizzical stare and raised brow that says "And what am I supposed to do with this?" There's a feeling in many kitchens that in order to make a wild duck edible, a short course at a French cooking school is essential. That's not the case. There's nothing mystical about turning out wild game dishes that get rave reviews from family and friends. You just have to keep the special characteristics of wild game in mind when preparing it.

The wood duck that comes winging into a beaver pond at 40 miles per hour only outwardly resembles a corn-fattened barnyard muscovy duck that couldn't get off the ground if it wanted to; and a whitetail deer that clears a 7-foot brushpile has little in common with a feedlot steer. Most wild game lack excess fats, and this presents one cooking problem. The presence of highly contractile muscle and sinew presents another.

Butter, margarine, olive oil, bacon drippings and bacon are used in many wild game recipes to help keep the meat from drying out while cooking, and moist cooking methods like foil wrapping and crock pots work well. Removing tendons and connective tissue, particularly from venison cuts, is also important because they contract under heat and toughen the meat.

Wild game dishes would improve markedly if cooks did not overcook. For my tastes, dark meat birds such as duck, goose, woodcock, dove and snipe are at their very best when cooked to a rosy pink in the center of the breast — a tender and juicy 140 to 145 degrees on a meat thermometer. (Dove breasts rubbed with olive oil, dusted lightly with garlic salt, wrapped with a half slice of bacon secured with a tooth pick and broiled close over hot coals for four minutes on each side gives a pink-at-the-middle doneness. It is juicy-tender and surprisingly like prime filet mignon in flavor and texture.)

For white-meat birds such as quail, ruffed grouse, wild turkey and pheasant, the juice will run clear at 145 to 150 degrees and the meat will be firm, moist and at peak flavor, whatever recipe you use. Most modern cook books specify 180 to 190 degrees for chicken or turkey and 190 degrees for goose or duck. While these may be fine for fat domestic fowl, any comparable game bird, lacking fat to help maintain moisture, will be dry, tough and have all the texture and flavor of cardboard at these temperatures.

More than 30,000 deer were taken by North Carolina hunters during last fall's hunting season, which means that there will be a considerable amount of venison on Carolina dinner tables over the next few months. Venison should be cooked as you would cook choice or prime beef. I find roasts and steaks most enjoyable when cooked to an internal temperature of 135 to 140 degrees, which gives a moist, pink center. It is blood-rare at 130 degrees, medium-rare at 140, medium at 150 and well-done (and somewhat dry and tough) at 160. Venison quickly looses its moisture and changes flavor when overcooked — and it cooks from rosy pink to overdone quicker than you can sear a finger on a hot griddle.

If you depend on time and temperature settings when cooking game, remember that oven-dial settings are subject to error — frequently by as much as 50 to 100 degrees. Oven thermometers help, but the only direct answer is a meat thermometer. The ordinary kind with its short spike-like insert works well on large birds and roasts, but often doesn't give accurate readings on small cuts or birds like quail or dove. More accurate thermometers are available in many kitchen specialty shops. They are a bit expensive ($12 to $150 or more) but for the serious kitchen, they're a good investment.

— *Curtis Wooten*

Fish Skinner Blues?

For those anglers expert — or lucky — enough consistently to catch moderate to large numbers of fish, dressing the catch is often a dreaded chore. In fact, many anglers give away large numbers of fish to avoid the time-consuming chore that has become easy for Mr. and Mrs. Hugh Morris of Cornelius.

Retirement has given Hugh an abundance of time for fishing Lake Norman, and he often comes home with sizable catches of crappie plus limits of largemouths and stripers.

To cut the time needed to clean fish, Hugh uses an electric appliance that most of us own but rarely use — an electric knife. This method may waste a small amount of meat from each fish, but the ease and speed makes up for this waste by enabling you to clean more fish in less time. A cleaning table of proper height makes the job more comfortable, and be sure to observe all of the normal safety precautions to prevent shock when using an electric tool.

Begin by cutting straight down behind the fish's gill cover and pectoral fin. Don't cut through the backbone — just to it! Turning the knife sideways, cut along the backbone nearly to the end of the meat at the tail. This procedure cuts through the ribs. Then, flip the entire fillet over the tail, and use the knife to separate the meat from the skin. Turn the fish over, and repeat the process. Next, cut the rib bones out of the fillet with a sharp knife, and trim off remaining pelvic fins, skin, or internal bones. The final product is a boneless fillet that is ready for the pan or freezer. With a little practice, you'll be amazed at how easy filleting fish can be with an electric knife.

— *Terry Shankle*

Experience The Outdoors

Would you like to pan for gold? Hike along one of North Carolina's scenic trails? Or take a first-hand look at some of the fish and other creatures which inhabit the State's inland and coastal waters?

If so, you're in luck — all you need to do is attend the Outdoors North Carolina Expo 83 in the Raleigh Civic Center from March 24-27. The show will be the largest exhibition featuring the outdoors in the Southeast.

"We expect the events and displays at the Expo to be as diverse as the outdoors itself," said Joseph W. Grimsley, secretary of the N.C. Department of Natural Resources and Community Development, which sponsors the show. "There will be educational exhibits sponsored by agencies of state government private conservation organizations. In addition, outdoor-oriented businesses will have exhibits. There will also be a number of special events including a fishing derby, running clinic, and a nationally known lumberjack water show will be featured in a large indoor pool."

"However, all the exhibits share a common purpose: to remind North Carolinians of their rich natural heritage, and to emphasize the need for wise management and preservation of our natural resources. The expo will not only be educational for everyone, but will also be a lot of fun."

The expo is part of a larger Outdoors in North Carolina program being undertaken by concerned citizens and the N.C. Department of Natural Resources and Community Development. This program focuses on four special natural-resource goals — awareness, appreciation, participation and stewardship.

Special "days" will also be highlighted at the show, "Kid's" Day is March 24, Senior Citizen's Day is March 25, and Country Music Night is March 26.

OUTDOORS NORTH CAROLINA

Calendar of Events

March 4-6, 11-13, 18-20, 25-27
Harkers Island Fishing School at Harkers Island. Includes instruction on offshore fishing, and one day of fishing the Gulf Stream. For more information, contact the Harkers Island Fishing Center, P.O. Box 275, Harkers Island, N.C. 28531.

March 12
Old Quawk's Day in Morehead City. Quawk calling contest, flounder flinging, scallop skipping, seafood and other events. For more information, contact the Carteret County Chamber of Commerce, P.O. Box 1198, Morehead City, N.C. 28557.

March 12-13
Commercial Fishing Boat Show at the National Guard Armory in Morehead City. Extensive displays of boats and commercial fishing gear. For more information, contact the UNC Sea Grant Program, P.O. Box 896, Atlantic Beach, N.C. 28512.

March 13
"Put Some Wild In Your Life" at the Schiele Museum of Natural History in Gastonia. An extensive exhibit of wildlife including raptor rehabilitation and wildlife habitat improvement. For more information, contact the Schiele Museum of Natural History, P.O. Box 953, Gastonia, N.C. 28052.

March 26
13th annual Folk Festival at Louisburg College. Traditional music and Southern Appalachian dancing and clogging features. For more information, contact Louisburg College, Box 845, Louisburg, N.C. 27549.

March 26
"Conservation '83" Conference at the Raleigh Civic Center. Seminars will focus on maintaining environmental programs in the face of budget cuts. For more information, contact the Conservation Council of North Carolina, 307 Granville Rd., Chapel Hill, N.C. 27514.

The Wildlife Endowment Fund Report

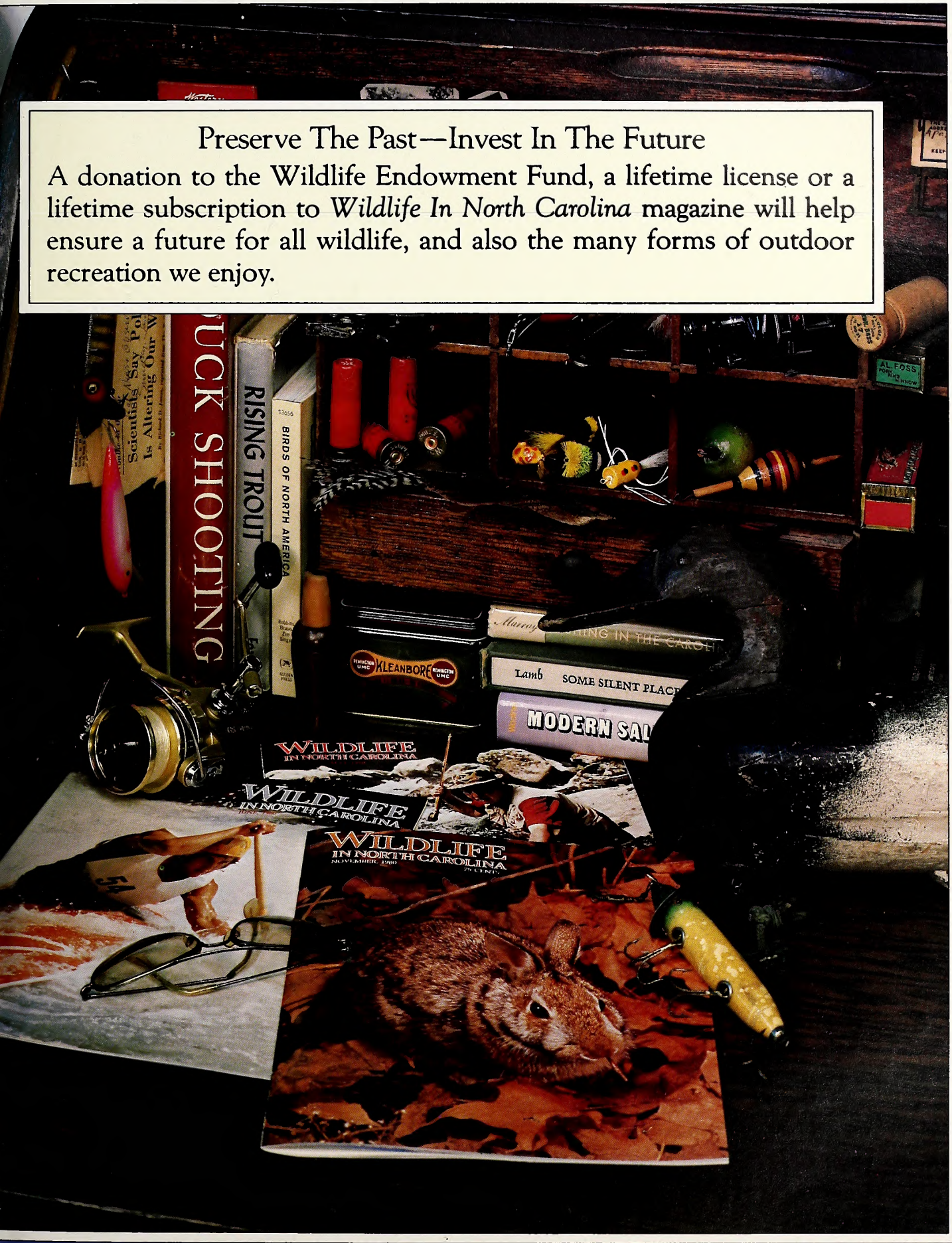
The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status On December 31, 1982

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	3668	$1,056,185.80
Lifetime Hunting License	49	8,072.63
Lifetime Fishing License	98	16,045.82
Lifetime Subscriptions to Wildlife In N.C.	125	13,249.95
Contributions		13,050.31
	Fund Total:	$1,106,604.41

Preserve The Past—Invest In The Future

A donation to the Wildlife Endowment Fund, a lifetime license or a lifetime subscription to *Wildlife In North Carolina* magazine will help ensure a future for all wildlife, and also the many forms of outdoor recreation we enjoy.



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WILDLIFE IN NORTH CAROLINA

APRIL, 1983 75 CENTS

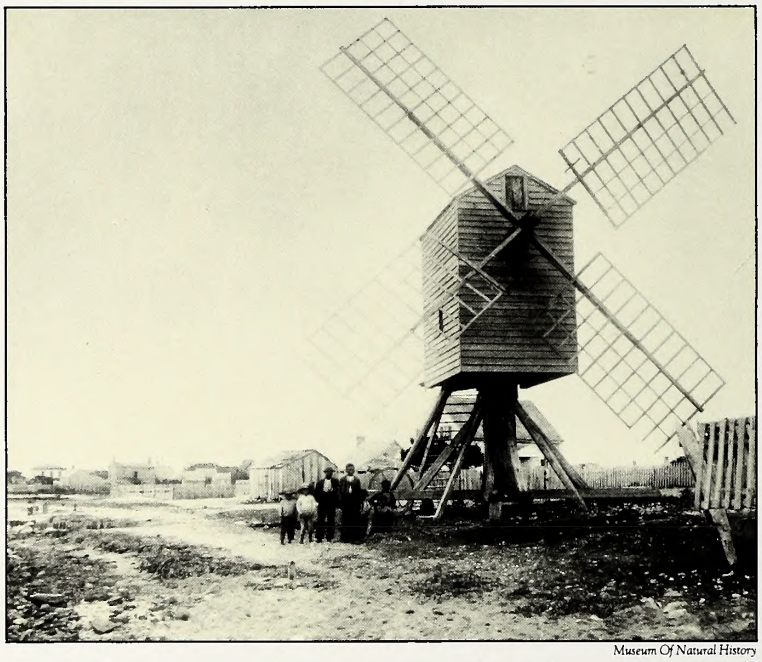
Carolina Windmills

by Jim Dean

Many native North Carolinians who have lived half a century or more recall a time when grist mills were still operating along streams throughout the State. But only the most seasoned of our citizens remember when grain was routinely ground by harnessing the power of the wind.

Until shortly after the turn of the century, many parts of coastal North Carolina must have looked much like Holland with windmills rising above the dunes on the Outer Banks, and many others on the mainland facing the sounds. While I was sorting through stacks of reference material for the article on water-powered grist mills that appeared here in the March issue, Dick Lankford showed me faded photographs of some of these mills. Dick's official title is iconographic archivist for the State Archives and History Division in Raleigh, which means he is responsible for historical photographs.

"For some reason, there has been very little research until recently into this rather colorful bit of our early history," Dick told me as we examined the photographs. "As far as we know, Tucker R. Littleton has compiled the only history of windmills in North Carolina for an article which he wrote for the October, 1980 issue of *The State* magazine."



Museum Of Natural History

This old windmill near Beaufort in Carteret County had already been abandoned when this photograph was taken in 1890.

Littleton uncovered records which showed that there had been at least 155 windmill sites along the eastern Coastal Plain — far more than he had expected. Though the first windmill on this continent was constructed in 1621 in Virginia, more than a century apparently passed before a windmill was erected in North Carolina. Though the first windmill here may have been built at Avon on Hatteras Island in 1723, Littleton was unable to document the construction of a mill until 1748 when a windmill was placed in operation in Nixonton in Pasquotank County.

By the mid-1800s, when windmill usage was at its peak, Carteret County around Beaufort apparently held claim to more windmills than the rest of the coastal area combined. Indeed, of the 155 windmill sites Littleton was able to find, 65 of them at one time or another operated in Carteret. Hyde County, with 24, and Dare County, with 21, ranked second and third.

Windmills were widely used to grind grain, though some also pumped water to either drain lowlands or flood canals and fields for rice crops. Wind power was the obvious answer for this part of the State because the flow in coastal streams was not swift, and the flat country made it impractical to construct dams and raceways. Wind was — and still is — a reliable source of power in the region.

Virtually all of the windmills along our coast were post mills. The mill house was mounted upon a post, and could be swiveled on this post to face the prevailing wind. A "tail pole" projected from the rear of the mill to balance the mill house, and the end of this pole usually incorporated a large wheel which rested on a track. By raising the ladder which provided entry into the mill and pushing on the tail pole, the entire mill house could be turned. The mill was so well balanced that one man could usually turn it.

The blades of the windmill — there were four in all of the existing photographs — were constructed of wooden frames which could be covered with canvas. By adjusting the amount of canvas exposed to the wind, the miller could control the speed of the windmill.

Unfortunately, the same wind that powered the mills frequently destroyed them. And if hurricanes didn't flatten them, lightning or fire usually claimed them eventually. By the turn of the century, only a few of the windmills were still standing and in operation, and as they were destroyed or abandoned, they were not rebuilt. Littleton speculates that not a single windmill survived past 1920. By that time, flour and meal were available at reasonable prices from inland grist mills, and steam and gas-powered mills were also making inroads.

Because the windmills were so vulnerable to the elements, none survived to remind anyone of their earlier prominence, and the photographic proof of their abundance was overlooked as the years passed. Had windmills been as permanent as lighthouses, they might today rival the famed Hatteras Light as a symbol of our coast.

Indeed, if Mrs. Lynanne Westcott of Manteo has her wish, these old windmills may experience something of a revival as part of our coastal heritage. She has constructed an exact replica of a typical post windmill at Nags Head, a quaint and colorful bit of history that had been virtually forgotten during the past 60 years.

April, 1982
Volume 47, No. 4

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and Community Development

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

CONTENTS

2 **Wild Country, Wild Trout** *by Joel Arrington*
Trout fishing is good on the Wildlife Commission's western game lands which include both Pisgah and Nantahala national forests.

12 **The Other EPA** *by Rick Estes and Lawrence S. Earley*
What goes on out there at EPA's huge facility at the Research Triangle Park? We went to take a look.

18 **Check-In For Wildlife** *by Lawrence S. Earley*
You may be able to earmark a small portion of your tax refund to help nongame and endangered wildlife if current legislation passes.

20 **Frames From A Life** *by Lawrence S. Earley*
Take a look at the natural world through the eyes of Jack Dermid, an excellent photographer who is no stranger to Wildlife In North Carolina.

26 **The Bass Few Anglers Know** *by Jim Dean*
Spotted bass are not new to North Carolina, but no one knew about them until recently.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

Back Of The Book *edited by Mark Taylor*

Cover *This purple gallinule was captured on film by Jack Dermid who used a 400mm Novoflex lens to take the picture. These birds can walk across lily pads and other floating vegetation by spreading their long toes and distributing their weight. For more of Dermid's nature photographs turn to page 20.*

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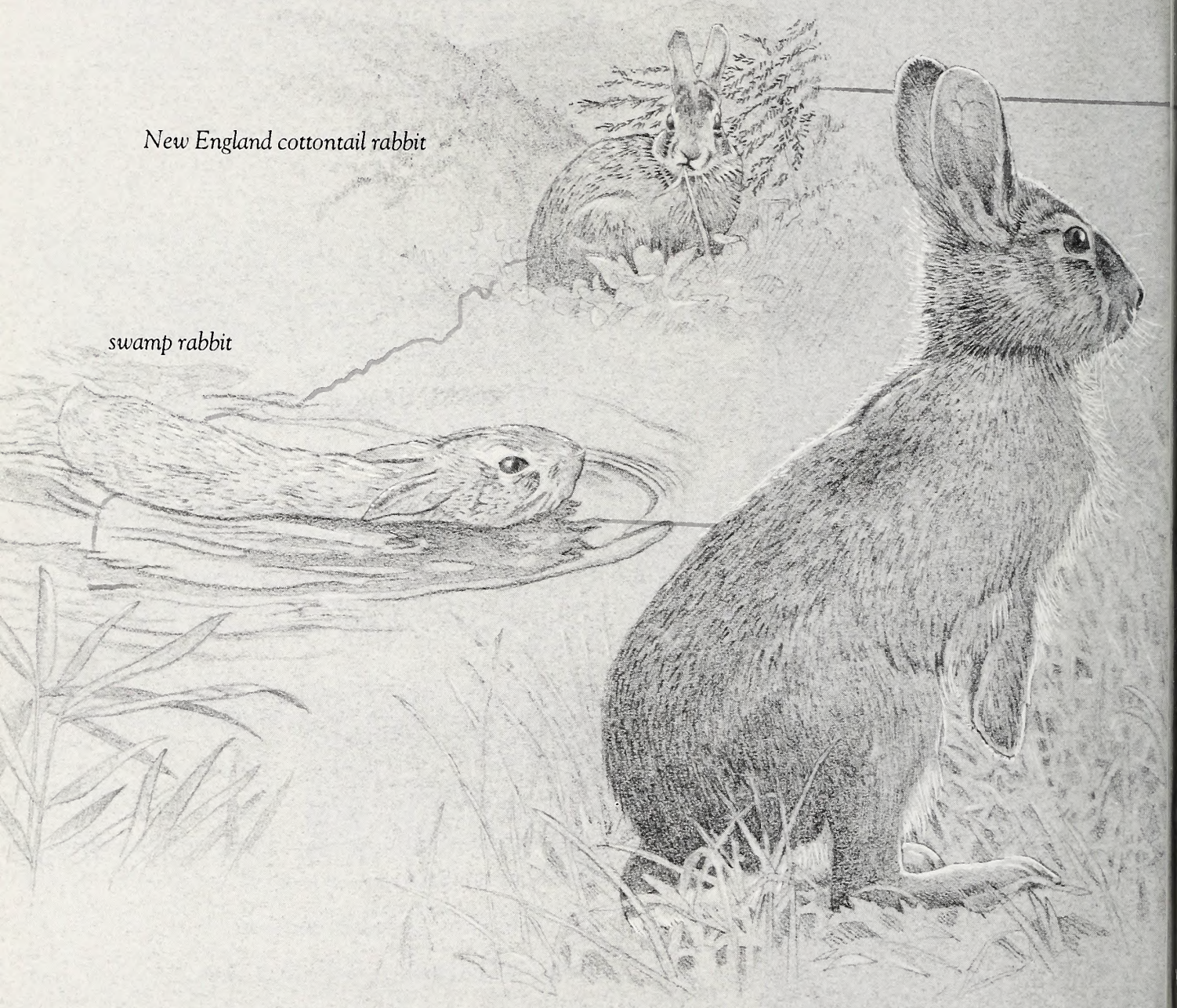


Rabbits Of North Carolina

by Lawrence S. Earley/illustrated by David Williams

The cottontail rabbit is North Carolina's most abundant rabbit, in spite of the fact that the odds of it celebrating its first birthday are about 20 to 1. Out of a litter of seven, possibly two or three will actually make it out of the nest and the going doesn't get any easier after that. That's how vulnerable the rabbit is to disease, predator, and, increasingly the loss of habitat.

But the cottontail is not the only rabbit in North Carolina. Two others are fairly common, and another is more rare. Altogether there are four kinds of rabbits in the State.

Eastern cottontail *(Sylvilagus floridanus)* — There are about 10 to 12 different cottontail species worldwide, with another 60 or 70 subspecies. The eastern cottontail, however, is the most abundant and common rabbit species, ranging in the United States from the eastern seaboard to the Rocky Mountains and down into Arizona and Mexico. It is about 14 to 17 inches long, with a brownish or grayish body and whitish feet, and it weighs from 2 to 4 pounds, according to Peterson's *Field Guide to Mammals.* It favors heavy brush and wooded areas with dense understories, and it feeds on all kinds of green shoots in summer and bark and twigs in winter. Beginning its breeding activities in March, it continues into September, giving birth to 4 to 7 hairless young about three or four times a year.

New England cottontail *(Sylvilagus transitionalis)* — One variety of the cottontail is found chiefly in the New England area but ranges down as far south as Georgia along the Appalachian Mountain spine which carries the habitat it demands. It is slightly smaller than the eastern cottontail and has a reddish coat

in summer and winter. It is found in some of our western counties at higher altitudes and may well be abundant in dense thickets even it it is not often seen.

Marsh rabbit *(Sylvilagus palustris)* — Also known as the "bluetail," this rabbit species is common in the lower Piedmont and Coastal Plain along rivers, in swamps and wet bottomlands. It hugs the freshwater regions, although it has been known to frequent the brackish coastal swamps as well. It is dark brown, weighs about 2½-3 pounds, has small feet and a small dingy white tail. The marsh rabbit and swamp rabbit are the only species that can swim and take easily to water to escape hunting dogs. The marsh rabbit breeds from February to September.

Swamp rabbit *(Sylvilagus aquaticus)* — Another wetland rabbit species, the swamp rabbit is known in North Carolina only because of a single specimen recovered in Clay County nearly 30 years ago. It is chiefly found along the Gulf coast and up along the Mississippi Valley, and is that region's counterpart to our marsh rabbit. At 3½-7 lbs it is larger and heavier than the marsh and cottontail rabbits. It, too, is a rabbit of the lowland areas, swims easily, and prefers to feed on cane, a habit that gives it its nickname, "canecutter."

Is the snowshoe hare found in North Carolina? Some range maps persist in showing it in the mountain areas of the State, but according to a new *Distributional Survey of North Carolina Mammals,* published by the North Carolina Museum of Natural History, no snowshoe or any other kind of hare has ever been recovered here. About 50 years ago, the jackrabbit was stocked here but like most "exotics," or non-native species, it quickly died out. Biologists, however, are intrigued by a large rabbit seen along the North Carolina-South Carolina border, near Laurinburg, although a lack of a specimen so far has made identification difficult.

Wild Country, Wild Trout

There's good trout fishing in our two largest national forests.

written and photographed by Joel Arrington

It is a reasonably stiff walk to the stream down a rutted logging road. With waders flopping over your shoulders and your rod tube employed as a cane, you walk down the steep twisting track more than a mile to streamside.

It is a fresh spring morning with the trees budding pale green and there is no need to push yourself, plenty of time to assemble the rod, thread the line, tie on the fly. You sit and pull on the waders while warblers flit in the brush and a big woodpecker is thumping a tree.

This is not big water, even by Southern Appalachian standards, so the wading will not be strenuous. Where you enter the creek, it is less than half a cast across with big pools and swirling eddies and steep rock ledges down to the water's edge. Higher up, you know it will be more staircased, the pools smaller, the runs swifter and white.

Heavy rhododendron thickets cling to the gorge walls and trees canopy the stream with their limbs. When fully leafed in summer they will deeply shade the water and snag your back casts. You will fish a short line in a tunnel of vegetation. You begin with a No. 12 blonde Wulff with big calftail wings. The leader is just over eight feet, the same length of the rod, and tapered to 4X at the point.

Not far up the stream you have settled into a pattern of probing the side eddies, the white-water runs and the sheer rock faces that edge the far shore. When a dace

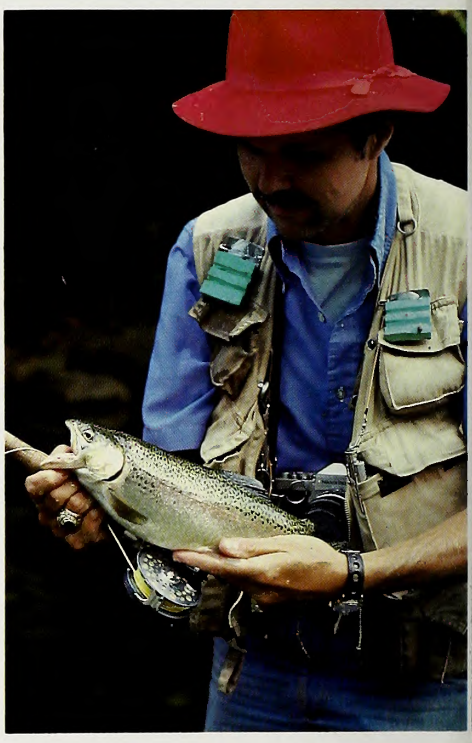
drowns your fly in the tail of a pool you set up too hard, lifting the line overhead so that it falls in disorder over your shoulder. You vow to rein in your reflexes, enforce the discipline that leaches away in winter.

Toward the head of the dace pool a spring-fed tributary enters through a miniature log-jam. The fly parachutes into the white water and is swept out quickly, then slows in a drag-free float. The take is sudden and simultaneous with the flash of the rainbow's flank. You lift the rod's tip with your wrist and are fast to the first darting trout of spring. The stream is cold and heavy against your legs, it tumbles and mumbles down the mountain, washing away the accumulated toxins of winter and the universe is in perfect order again.

There will be more of these rainbows for you up the creek and a red-spotted brown that reaches almost 14 inches. It will be nearly dark when you climb out to the car, panting and weak, 15 miles to the motel and food, light years from your everyday world.

"These are the highest mountains in eastern America, with more than 40 peaks over 6,000 feet and some 80 between 5,000 and 6,000 feet."

About half of North Carolina's 4,000 miles of trout streams are open to the public, and those streams which are located on game lands (National Forest land) are among the best, offering good fishing for largely streambred trout, including some whoppers like this fat rainbow.



In western North Carolina, the Southern Appalachians extend down from Virginia in two parallel arms — the eastern Appalachian chain and the western Appalachian chain, including the Blue Ridge on the east and the Smoky Mountains to the west. Connecting the arms like rungs of a ladder are cross-chains — higher and more massive than the principal ranges — on the plateau between. These are the highest mountains in eastern America, with more than 40 peaks over 6,000 feet and some 80 between 5,000 and 6,000 feet. It is a heavily forested region laced with swift streams.

Nearly all of it is blanketed with subclimax hardwoods now, but the aboriginal Appalachian forest must have been an awesome sight. Almost everywhere on the steep slopes, trees of perplexing variety vaulted over clear understory. Tulip trees reached nearly 200 feet with straight trunks clear of branches for the first 100 feet. Canadian hemlocks reached 100 feet and chestnut oaks were nearly as tall. Before the blight, some chestnut trees were almost 11 feet through. You still find their rotting, moss-covered remains where they have not been salvaged for wormy paneling and frames.

In variety, the Southern Appalachians are second to no forests outside the tropics. In wealth of species, neither the Northern Appalachians, the Rockies, the Cascade-Sierras, nor the Pacific Coast Range dare compare themselves. More tree species occur in the Smokies alone than in all of Europe. Nowhere else in the world is there a comparable hardwood forest.

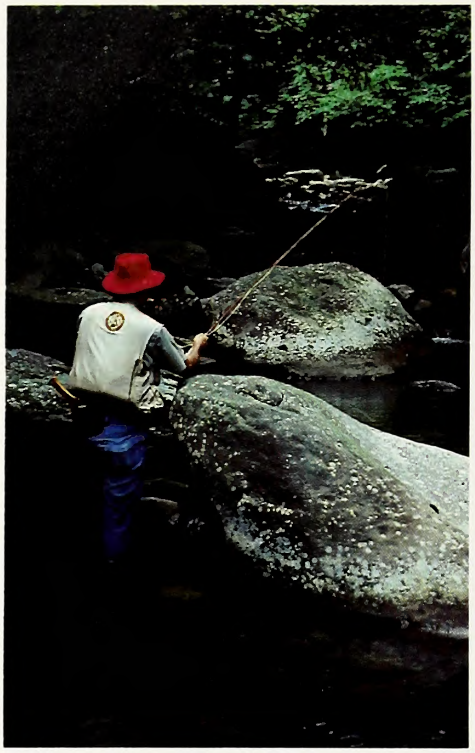
Much of the original grandeur of these woods remains despite several generations of logging. One still may view what is left of the aboriginal forest at Joyce Kilmer Memorial Forest near Robbinsville and similar old growth timber at Linville Gorge Wilderness Area near Linville and at Black Mountain near Asheville.

Rainfall on these mountains is prodigious. Warm, moisture-bearing air from the Gulf of Mexico condenses on the western slopes so that annual rainfall usually exceeds 80 inches. The eastern continental divide runs the ridges of the eastern Appalachian chain so that some of North Carolina's rivers flow to the Gulf, others to the Atlantic.

Since the mountain soil is composed mostly of solid igneous rock, water runoff is low in dissolved nutrients. Consequently streams are relatively infertile, insect production is often low and trout populations are not as heavy as they are in the richer streams of the Northeast and far West. Fish growth is slow, compared to that of limestone streams, and maximum size is somewhat limited. Heavy rainfalls, usually associated with hurricanes, periodically scour stream bottoms, further limiting insect life.

Nevertheless, good fishing for rainbow and brown trout exists, and often in as wild a setting as occurs in the eastern U. S. But angling methods that are productive on big western waters or on limestone streams of the Northeast must be modified on the streams of the Southern Appalachians.

Brook trout are the native species. Their habitat requirements are high and non-negotiable. Only the coldest and



"North Carolina trout are opportunistic. The ones that have survived have learned to take what comes down the stream or go hungry."

Wild trout in these small southern streams may not feed with the same degree of selectivity as trout elsewhere, but they are often far more wary. Anglers must stay hidden behind rocks or learn to fish under over-hanging brush to reach unsuspecting fish. Even then, you only get one or two casts before spooking your quarry, and the first fishermen through the water each day is often the only one who will catch anything.

cleanest streams will support them. Early logging operations denuded mountain slopes so that creeks warmed and became silted. Pure brook trout streams became fewer and higher until today they are only an insignificant fraction of North Carolina trout water.

Ironically, logging, which doomed brook trout, provided the means to establish rainbow and brown trout, because it was on narrow-gauge railroads built to carry out timber that non-native trout species were first hauled up the hollows and stocked. Rainbows and browns were first introduced by private landowners shortly before the turn of the century and only later was the task taken over by, at first, the federal government, later the State. Today, a vast fishery for trout exists in the Nantahala and Pisgah national forests which together spread over more than a million acres of the Southern Appalachians. Rainbow trout are the backbone of North Carolina trout fishing. They are tolerant of warmer water than brook trout and are more difficult to catch. The typical rainbow is 5 to 10 inches, but it is not uncommon to catch fish in the 11 to 13 inch class, and fish 20 inches or better are occasionally caught.

Brown trout will also tolerate warmer water than brook trout, and they are extremely wary, the hardest of North Carolina trout to catch. Inexperienced anglers may fish streams with wild brown populations and not even get a strike. Some browns grow to relatively large size, even in small creeks. They prefer the larger, slower streams with an abundance of crayfish and minnows, but they also do well in small, swift water. Browns are strong fighters, but not as acrobatic as rainbows. Like rainbows, most are under 10 inches, but streams with good populations hold good numbers of fish in the 11 to 15-inch class, and whoppers measured in pounds, rather than inches, are caught. A few reach weights of 8 to 15 pounds in favorable habitat.

In North Carolina, the terms "native" or "wild" trout have come to mean a trout that was spawned in the stream. Of course, only brook trout are native in the true sense of the word, since rainbows came from the West Coast and browns from Europe, and brookies are actually char rather than trout. When one refers to a wild brown trout, he has in mind a fish that can be as challenging to catch in clear water as any that swims. Stocked trout are not nearly as difficult and freshly stocked fish are often pushovers. All these kinds of fish are found in the Nantahala and Pisgah national forests, although not necessarily together.

Stream fertility determines trout tactics. Since nutrition, and therefore insect production, is low, hatches are small, extremely varied, unpredictable and of short duration. With few exceptions, trout do not have time to get locked into feeding on a specific insect type, and consequently do not develop exclusive preferences. North Carolina trout are opportunistic. The ones that have survived have learned to take what comes down the stream or go hungry.

There are a few exceptions. Generally, those streams west of Asheville have more and bigger hatches that those east. There-

fore, fish lock in more traditionally to a particular insect form, and matching your fly to the insect coming off becomes more important, but never to the extent it does in limestone streams. The Davidson River, for example, is artifically, but organically, enriched by a fish hatchery effluent. In late winter or early spring, it has a Blue Quill hatch, size 20 or 22. Later in spring there is a Hendrickson hatch and throughout the summer hatches are taking place off and on. On the Nantahala River there is a Green Drake hatch for a week in June. But on most streams in western North Carolina, trout are not particularly selective most of the time.

Anglers who have learned this basic fact will save themselves a lot of fishless hours trying to match the few insects coming off the water. Presentation is everything. The fisherman who cut his angling teeth in the Northeast, where he can fish over one trout for an hour, has a hard lesson to learn with Tar Heel trout. Once you have cast a line or dragged a fly over a North Carolina wild trout, you rarely get a second chance. On a Northeastern limestone stream, you can fish relatively close behind another angler and probably catch fish. On a freestone stream, such as those in the Pisgah and Nantahala national forests, it may take hours, or all day, for fish to resume feeding after a fisherman has gone up a stream. Later you will learn that there was someone two hours ahead of you. The only exception to this is after a rain when the water is roiled and on freshly stocked trout.

The experienced North Carolina angler fishes fast, covers a lot of water, rather than concentrating too long on one specific location. He does not get hung up on a pretty pool. He knows he will either catch the fish with the first few casts or put them down, so he moves on.

Attractor patterns are often more important in North Carolina trout streams than flies tied to imitate specific insects. On a heavily canopied stream where light level is low and the water is fast (and much Tar Heel trout water is like that), you have to fish a fly you can see. Large hairwings in sizes 14, 12 and 10 have emerged as the most dependable attractor dry flies in North Carolina. Royal Wulffs, Blonde Wulffs, Au Sable Wulffs and Irresistibles catch a lot more fish than other drys. Certainly they are in wide use, and if you consistently fail to catch fish on them, you're doing something else wrong.

While patterns do not matter much, it pays to experiment. You can fish a big latex nymph when the water is roily in hope of taking that one big trout rather than the many smaller ones. Terrestrials sometimes work well in summer — muddlers, hoppers and ants. One of the reasons the Irresistible is such a good dry fly in North Carolina is that it is a nondescript pattern that may be taken for a terrestrial.

The main points are to fish a fly you can see, fish it fast, cover a lot of water and —

Trout Unlimited, For Serious Anglers

Since its beginning in Michigan in 1959, Trout Unlimited has grown from a handful of dedicated Au Sable River trout fishermen to an organization of more than 26,000 members. Its goal is preserving, protecting and enhancing the cold-water fishery — trout and salmon — in North America, but there are members worldwide, and affiliate chapters in Canada and New Zealand.

North Carolina has shared in this growth. There are now 752 Trout Unlimited members as compared to only 336 in 1980, yet this still represents only a small fraction of the number of trout fishermen in the State. That is somewhat surprising considering that the goals of Trout Unlimited benefit virtually everyone who fishes for trout, and especially those who want to see their sport survive and prosper.

The major overall objective of this organization is ensuring that waters which support trout continue to do so, and that their quality is not degraded. To do this, local chapters work with state and federal agencies in scientific research and field projects, and in some cases, actually assist in projects to improve habitat. In recent years, North Carolina members have helped North Carolina Wildlife Resources Commission biologists stock fingerling trout by backpacking the fish into streams. Members have also supplied labor in constructing stream-improvement devices, and worked with biologists in other ways to improve trout fishing.

Trout Unlimited members also keep an eye on trout waters and report threats such as siltation, fish kills, or development which may violate laws and degrade trout

"The experienced North Carolina angler fishes fast, covering a lot of water, rather than concentrating too long on one specific location."

Streams which hold populations of wild brown trout — and that includes many bait-fishing streams — will invariably harbor a surprising number of lunkers like this fat brownie. Because of their wariness, they are more difficult to catch than other trout. While browns eat lots of crayfish and often feed at night, they still retain an interest in insects even after they reach large size, and can be caught on flies.

most of all — employ stealth. Approach pools on your knees if necessary, and it may well be necessary in later summer when the water is low and clear.

In tackle selection, the most common mistake the novice makes is selecting a rod that is too short. It would seem that a 6- to 7-foot rod would be best for small streams with heavy canopy. But much fishing in North Carolina is with a short line from behind a big rock. You reach over and dapple the fly not far off the rod tip. A 7½-foot rod is fine, but an 8 or 8½-foot rod balanced with a size 5 or 6 weight line is even better for this kind of work.

Leaders should taper to 4X for general work, down to 5X and rarely 6X in the low, vodka-clear streams of late summer, and relatively short 7½-foot leaders are fine for most conditions.

Fly-fishing for trout in the South may be different from the classic "match the hatch" angling found elsewhere, but it is no less appealing, in my opinion. Furthermore, our streams are more remote, and many offer a wilderness experience that is all too rare anymore.

abitat. In addition, Trout Unlimited upports sound regulations, and encourges land and water practices and the nactment of laws which protect coldwaer fisheries.

Then, of course, there are the opportunities at meetings to learn more about rout and fishing techniques, and perhaps hare a tale or two. Most Trout Unlimited hapters meet about once a month, and ost a program on trout or trout fishing. In ddition, an annual membership and und-raising meeting is held, usually in ugust. Members receive *Trout* magazine.

For novice anglers, joining Trout Unlimited can be particularly helpful in learning how and where to fish, as well as making new friends with a common interest.

In North Carolina, most Trout Unlimited chapters are located in the western part of the State, but some are in the Piedmont as far east as Raleigh. Those interested in receiving a list of these chapters and their addresses, or learning more about Trout Unlimited, can write to the national headquarters. The address is Trout Unlimited, 501 Church St., NE, Vienna, VA 22180.

The Other EPA

by Rick Estes and Lawrence S. Earley

While we were waiting in the lobby of the U.S. Environmental Protection Agency at the Research Triangle Park a bell rasped noisily over the security-control desk. Two uniformed guards immediately looked behind them at a constellation of blinking lights on a wall map of the EPA research complex. One of the guards picked up the phone and spoke busily in low tones. For just a second there was tension in the air, and then it was over and doors opened and closed and people came and went in the cold January morning.

It was a symbolic moment, for things are tense in this the chief environmental agency of the land. In Washington, as of February, EPA's administrator, Anne Gorsuch Burford, was under a contempt-of-Congress citation, another EPA official, Rita Lavelle, had been summarily fired, and intense congressional scrutiny was being directed at the agency that more than anything has been responsible for a cleaner environment in the United States since it was established in 1970.

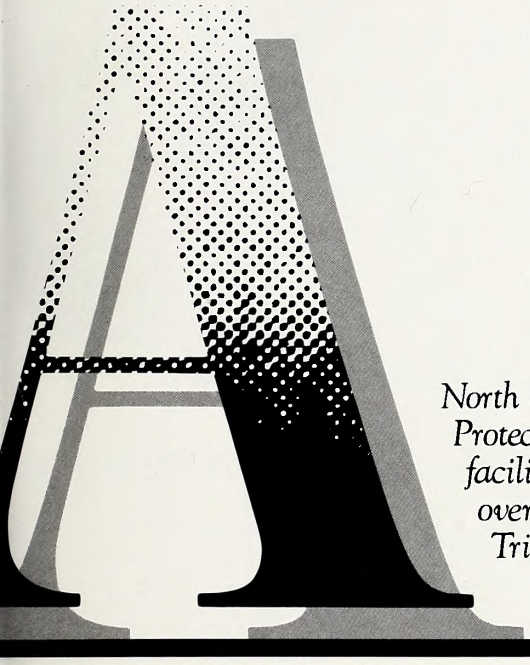
It seemed a good moment to visit another EPA, the EPA that quietly goes about its business in North Carolina. Nestled in the pines of Research Triangle Park is a four-building complex which constitutes EPA's largest research facility in the country. It employs 1,100 people, most of them scientists and technicians, the largest number of EPA employees outside of Washington, D.C. Four laboratories are clustered on the site, most of them in the U-shaped, six-sided main building called the Technical Center.

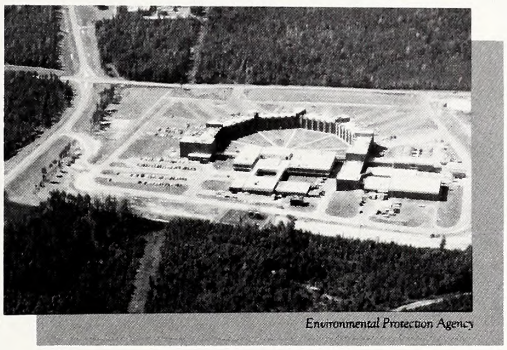
What does EPA do in this giant complex? Associate editor Larry Earley and I went to find out. We spent a day touring the labs with Public Affairs Officer Deborah Janes, talking with lab directors and technicians, wondering at the technology and trying to make sense out of the sprawling affair.

Research is its main concern, we found out. Why research? Dr. John Clements, Director of the Environmental Monitoring Division, had a brief answer. "Research is necessary to the EPA to make sure the agency has a scientific base for its regulations so that they can withstand scientific scrutiny." EPA is charged with controlling the country's pollution problems by establishing air and water quality standards. The four labs in the Research Triangle are part of a network of 15 research labs around the country that line up under the Office of Research and Development. The Research Triangle labs are only concerned with air pollution. EPA labs in Cincinnati deal with water pollution, while others in Las Vegas deal with waste dump sites.

As we quickly found out, in learning how EPA, or any government agency works, you have to master an alphabet soup of titles. In most conversations the names of the labs are shortened to IERL (Industrial Environmental Research Laboratory), the EMSL (Environmental Monitoring Systems Laboratory), the HERL (Health Effects Research Laboratory), and the ESRL (Environmental Sciences Research Laboratory). The complex itself is known as the ERC (Environmental Research Center).

We began our tour with ESRL projects. To do this we left the Technical Center and drove to a site visible to commuters traveling U.S. I-40. Dr. William Snyder's Fluid Modeling Facility was housed in a gymlike building which was once in fact an indoor tennis court. Inside, two huge tanks — a modified wind tunnel and a





Environmental Protection Agency

North Carolina is home to the Environmental Protection Agency's largest air pollution research facility. Midst all the controversy in Washington, over 1,100 scientists and technicians in the Research Triangle quietly go about their vital work.

large water tank — dwarfed us and the technicians who were working with them.

"The ESRL," Dr. Snyder said, "is supposed to research the transport and transformation of chemicals in the air. Our overall goal is to predict the kinds of pollution concentrations that people — or even plants and building surfaces — will be exposed to under certain conditions.

"The Fluid Modeling Facility does small-scale studies of complex flow situations. Researchers elsewhere do mathematical models of how pollutants are dispersed along an area as large as the eastern corridor of the U.S., for example. But they are less able to study how a particular hill or a building affects the dispersal of pollutants in a smaller area. We can simulate what might happen by working with models in our wind tunnel."

He pointed to the glassed-in tunnel where we could see smoke emitted from a miniature industrial smokestack being blown horizontally by a controlled wind source. "Basically this type of setup allows us to learn how different heights of smokestacks will disperse their effluents and how the terrain, the plant design and prevailing winds will determine where and how fast the stuff goes." Experiments here have enabled industries to save millions of dollars on plant design. (See "Problem: Short Stack Or Tall?" p. 17).

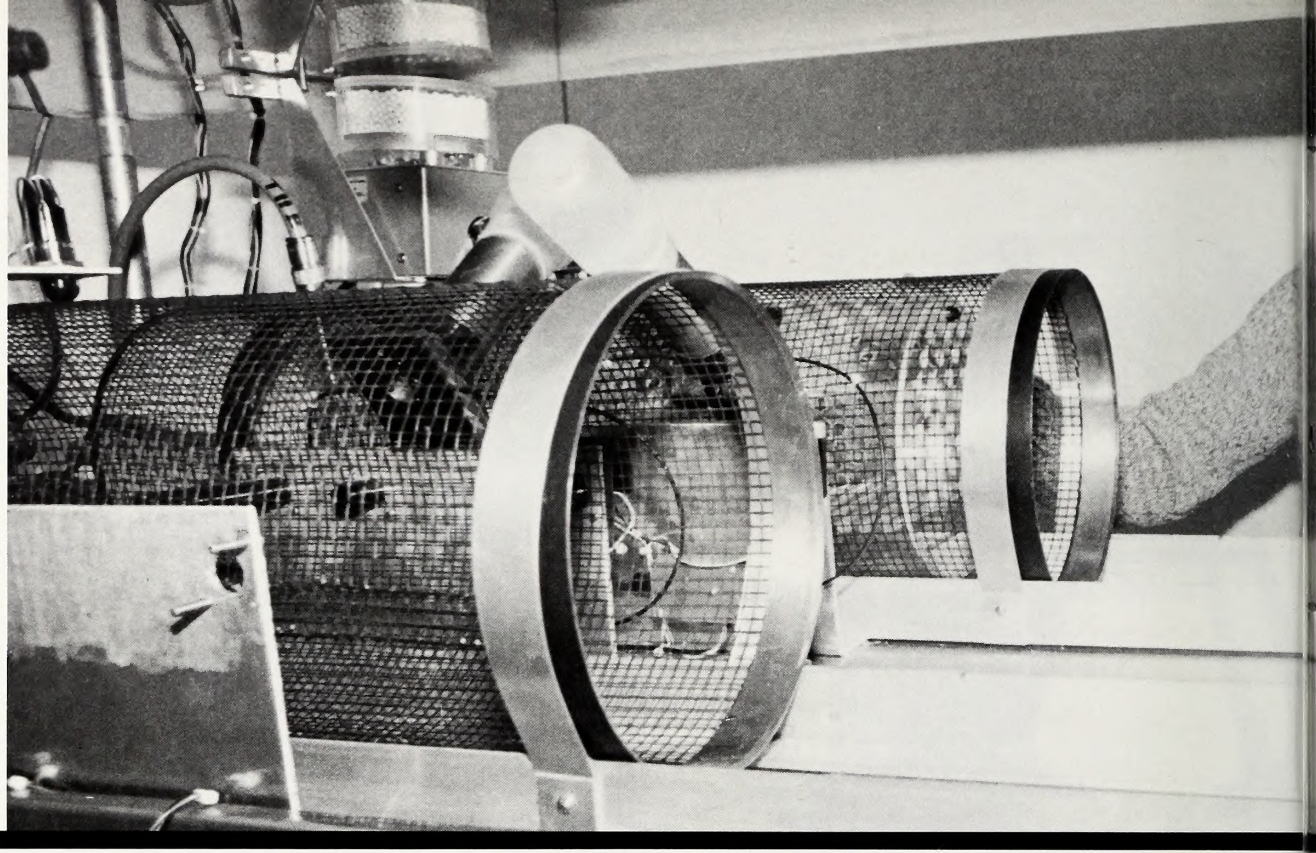
We climbed a set of metal stairs to a catwalk alongside a huge glass and metal water tank, over 100 feet long. "The wind tunnel," said Dr. Snyder, "only allows us to simulate a high wind and its effects. The water channel- towing tank here goes a further step. By placing various concentrations of salt water in the tank, we can simulate the kind of layering that occurs naturally in the atmosphere due to constant changes in temperature. This water tank will allow us to study how air pollutants spread during a thermal inversion, for example."

ESRL researchers are also studying what happens to pollutants from moving sources as well as stationary sources like industrial plants. Cars and heavy-duty trucks spew pollutants into the air in enormous amounts, and ESRL researchers are studying the effects of such airborne chemicals as lead and nitrogen oxides. Returning to EPA's Research Center we visited Dr. Ronald Bradow's Mobile Emissions Branch. In an enclosed room the exhaust from a flat-bed delivery truck was run through a series of valves and hoses and collected in a plastic bag.

"This is a truck fueled with leaded gasoline," Dr. Bradow said. "What you're looking at is a controlled environment in which the truck, on an electrically driven treadmill, is made to experience the same effects as it would if it were actually driving under three different kinds of conditions: a crowded city route, an arterial route (like Wade Avenue, in Raleigh), and expressways. We can simulate these conditions fairly exactly, even to the air flow that enters the engine compartment."

Instruments in another room analyze the emission rates characteristic of these driving conditions, and these data will be used by other agencies in finding how certain classes of vehicles affect the pollution patterns in cities. "Basically, we give the data to state and local people and say, here's our best estimates of the emission rates of trucks. They will use this data in their pollution-control efforts. They might choose to reroute truck traffic in certain areas or at certain times, for example."

Dr. Bradow is also studying the emissions from long-haul, heavy-duty diesel trucks and buses. These kinds of engines are the only sources of two kinds of pollutants: black carbon and nitrogen oxides. Black carbon is black and sticky, and in cities, where its effects are most often felt, it's a very disagreeable substance. "We're particularly concerned about nitrogen oxides,"



said Bradow, "because of their contributory effects on acid rain."

Our next stop was the Environmental Monitoring Systems Laboratory (EMSL) where we talked with Dr. Thomas Hauser, the Director, and Dr. John Clements, Director of the Environmental Monitoring Division. As the title of their lab suggests, their work is primarily involved in monitoring air pollutants. Dr. Clements explained how their work fit into the overall aim of EPA.

"Air pollutants occur either as gases or as solid particles — particulates, as they are sometimes called. These are the two main classes, and even though the amounts may be small they are very important. You have to have the means to measure these amounts. So the two questions we handle are — what's out there in the air we breathe, and how much of it is there."

Dr. Hauser spun a picture for us of an old farm truck lurching down a dusty rural road. "Now a lot of that dust boils up in your face, dirties your car and your clothes," he said. "But we've learned that very little of it actually gets into your lungs. Most of the larger particles in that dust cloud, and in other forms of air pollution, are filtered out in your nostrils, mouth and throat. There's no sense in monitoring the big stuff. That's why our 55 membrane filter monitoring stations across the country are concentrating their collection and analysis of airborne particulates on the really small stuff — down to 10 microns (1 micron = 1/1000 of a millimeter) and less."

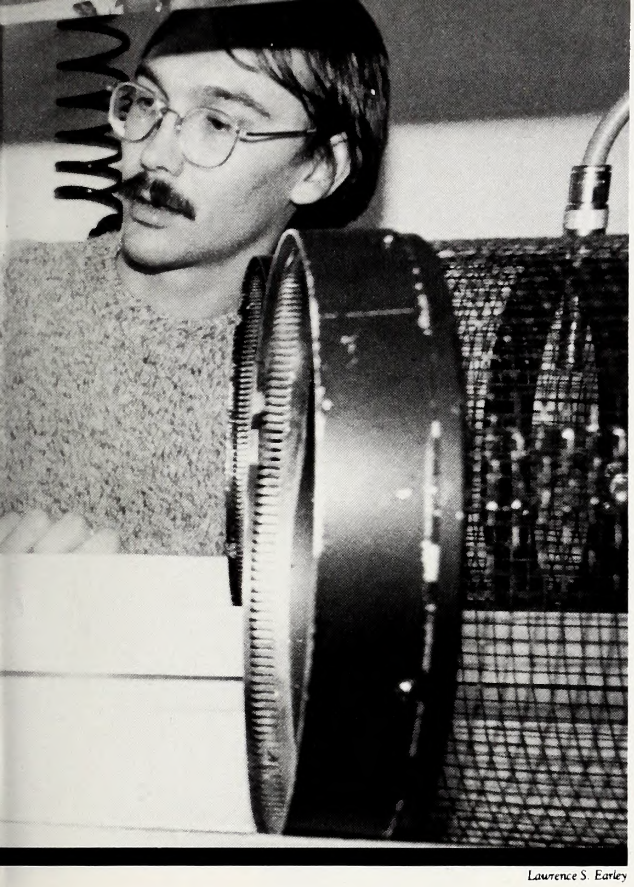
EMSL researchers also assist states in monitoring pollution reliably and accurately. Says Dr. Clements: "A lot of the requirements for pollution control are laid on the states. This means that the federal government specifies a certain concentration level of carbon monoxide, for example, but states have to take steps to enforce it. They do this through a State Implementation Plan (SIP) which might prohibit parking in certain urban locations, among other things. The states have to have a system by which they can convince us that their monitoring efforts of carbon monoxide are reliable." EMSL provides guidelines and training for state monitoring efforts.

We left Dr. Hauser talking nostalgically about the Cincinnati Reds, his former hometown baseball team, but we had to hurry on to our next destination, the Health Effects Research Laboratory (HERL). Here studies are going on to determine the health effects of exposure to air pollutants, pesticides, toxic substances and non-ionizing radiation. In Dr. Robert Dyer's Neurophysiology Branch, we were introduced to white rats with electrodes implanted in their brains. White-coated researchers were studying the wave lines of electroencephalograph (EEG) machines. Dr. Dyer's team is studying how the brain reacts to certain pollutants.

"Thousand of things go wrong in different areas of the nervous system as a result of exposure to a toxic substance," he said. "We're trying to find methods to measure what goes wrong. We don't test toxic compounds and say which ones are toxic. We take compounds which we feel are toxic, expose them to animals and then run the animals through lots of tests."

One such test might be flashing a light at a rat hooked up to an EEG machine. "The brains of rats — and humans — react to a light flash in the same way. We look for changes in the characteristic responses of animals who have been exposed to certain pollutants."

After determining what methods will measure the effects of a certain chemical, the results are published in scientific journals, and affected industries are notified in



Lawrence S. Earley

order to help them in their own testing for the potential toxicity of chemicals they are producing.

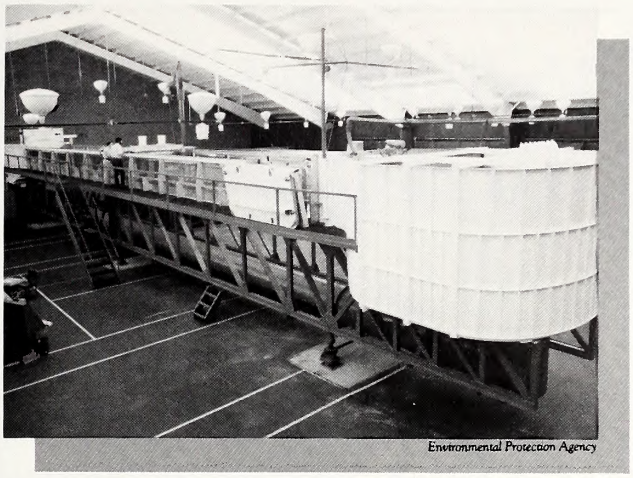
"Studies like these have been very important in showing how brain functions are affected by lead," said Dyer. "The results of those tests were used to set standards for allowable levels of lead in the environment."

One pollutant for which standards have yet to be established is non-ionizing radiation. This ever-present form of energy is emitted by radio and TV transmitters, microwave ovens and even brick walls. Little is known about the effects of long-term human exposure to non-ionizing radiation. Dr. John Xeriac of the Neurotoxicology Division, Behavioral Toxicology Branch is investigating its effects on the behavior of white rats in a carefully controlled experiment.

"We have two sets of animals," Dr. Xeriac explained. "One is exposed continuously to a source of non-ionizing radiation which we generate, and the other is exposed only to the radiation generated by structures in the room where the rats are kept." The rats' every move and activity is monitored electronically. "We know when a particular rat turns, walks, eats and drinks," he said.

"By comparing the behavior of the exposed rats to that of the control group, we hope to learn whether and how radiation changes daily patterns of activity." Although research by Dr. Xeriac and others indicates that non-ionizing radiation can be harmful, much more data are needed before predictions can be made on how much radiation may be too much.

We left Dr. Xeriac's lab through a rat's maze of hallways and made our last visit, this one to the Industrial Engineering Research Laboratory. Researchers here, we found, spend much of their time in front of furnaces and they literally have fire in their eyes — and on their minds.

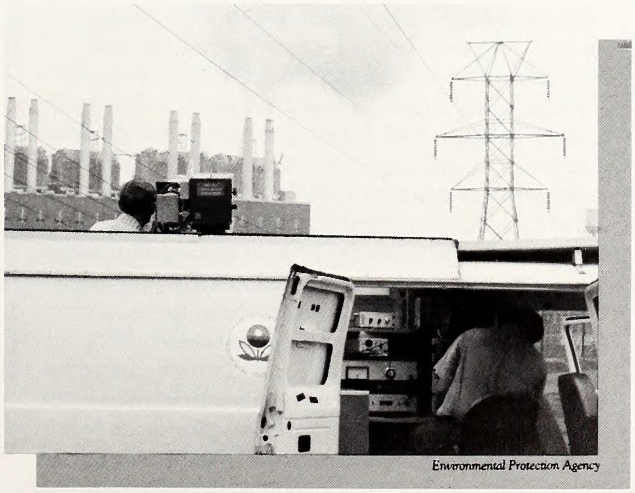


Environmental Protection Agency

Mammoth water tank dwarfs researchers in Fluid Modeling Facility. Experiments here test how pollutants will disperse in the lower atmosphere. Dr. John Xeriac (left) tests the effects of non-ionizing radiation on rats.

Lawrence S. Earley

Experiments with rats can show how a pollutant acts on the brain. Tests in the Health Effects Research Laboratory help determine the hazards of exposure to air pollutants, pesticides, toxic substances and non-ionizing radiation.



Environmental Protection Agency

Technicians monitor air pollution in hundreds of EPA stations around the country. Monitoring efforts like these are important in enforcing EPA standards which govern the concentrations of pollutants in the air we breathe.

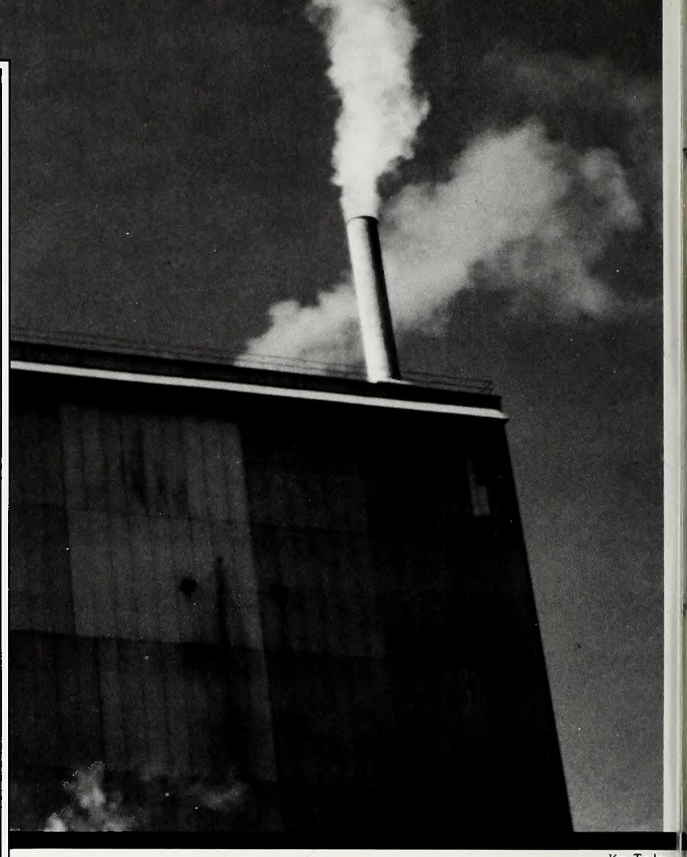
From Research To Regulation

How are air-pollution regulations set? It should work this way: EPA in Washington sets "ambient air quality standards" based on research performed in its Research Triangle labs and elsewhere. These standards specify the concentrations of an airborne pollutant that are harmful to the public health and welfare. The states comply with these standards within nine months by issuing regulations governing smokestack emissions. In North Carolina the Environmental Management Commission regulates pollutants.

Lately it's not been so simple. EPA's proposed ambient air quality standards are actually set by EPA administrators after industries, environmentalists and other interested parties have commented on them. In practice, standards have always been decided as much for their economic impact as how well they protect the environment.

Under the current administration, economic considerations have become even more important, leading to significant budget cuts at EPA, and, worse, to some relaxation of pollution standards. The EPA's 1983 budget is $85 million less than in 1982, and $237 million less than in 1981. The agency has moved to give states and industries more flexibility in meeting environmental goals as part of its program of regulatory relief. Examples of such relief include allowing the auto industry to certify that its vehicles have met high-altitude pollution standards, issuing testing procedures for toxic substances as guidelines instead of standards, and deferring the 1983 truck noise standard to 1986.

Spokesmen for selected North Carolina industries and municipalities say that the regulatory climate in the State has improved over the past few years. Conservationists wonder whether this is such a good thing. They worry that the EPA's budget cuts and program of regulatory relief are compromising its ability to do its job — to protect the environment.



Ken Taylor

The IERL is an engineering program that evaluates and develops pollution-control technology for industry," said Frank Princiotta, director of IERL. "As a result most of our work is with combustion sources. For example we developed the flue gas desulfurization systems used to remove sulfur oxides, which are pollutants given off by the process of burning coal. We also have developed a less expensive technology for removing particulates from smokestacks. Burning coal produces particulates — small particles like soot and dust.

"Another important area we are working in is developing an innovative technology which could be a means for controlling nitrogen oxide and sulfur oxide emissions, the sources of acid rain.

"The purpose of our research is really two-fold," Princiotta added. "It helps in regulatory matters, for if we develop workable technologies for pollution control, they can be placed into EPA standards and industries will have to use them. But we're also working directly with industry to help companies reduce the costs of meeting current EPA standards."

Our tour of "the other EPA" was over, but we chatted a little with Deborah Janes before leaving. She observed that she had been getting very few calls about EPA from the media. "It's almost as if they didn't know we existed," she said.

But perhaps it's better that way. Certainly EPA's employees in North Carolina and elsewhere must prefer anonymity as they watch while their agency's once-proud banners are dragged through the mud on nightly televison. As we learned on our tour, however, "the other EPA" is still carrying on their anonymous, perhaps, but critical research. And their work still continues to be the best chance we have of getting a clean and healthy environment.

Problem: Short Stack Or Tall?

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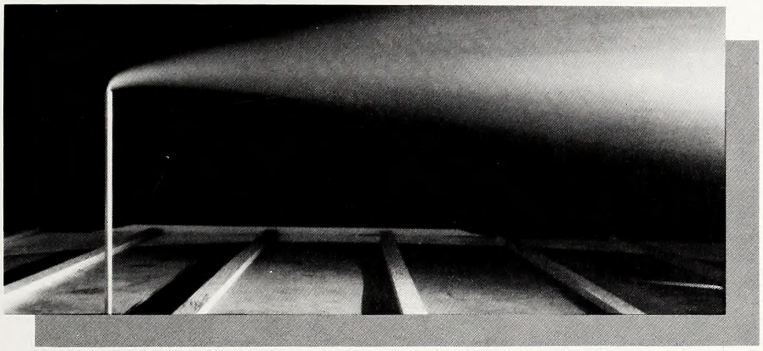

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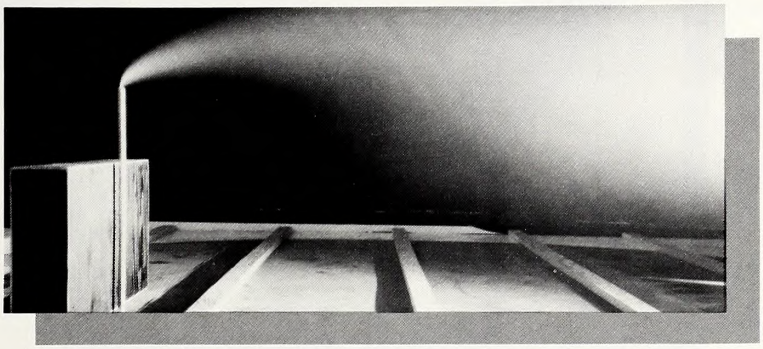

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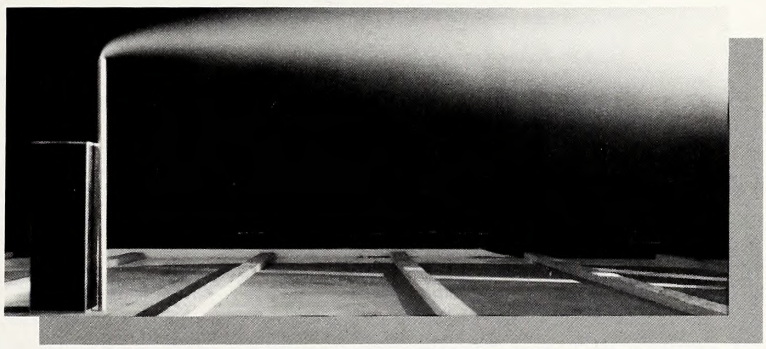


Environmental Protection Agency

In 1976, Dr. William Snyder of the Fluid Modeling Facility at EPA's Research Triangle labs performed some experiments involving the construction of a power plant in Texas. The utility company wanted to build a plant that would burn lignite, or brown coal. EPA regulations normally required that such proposed power plants construct a smokestack 2 1/2 times the height of the building. However because of the tall and narrow design of this plant, the resulting stack would have been 750 feet tall and cost $15 million to construct.

Was a stack this tall really necessary? Snyder used the wind tunnel in his Fluid Modeling Facility to find out.

Photo 1 shows smoke from a model smokestack in the wind tunnel carried well out of the area by a wind source.

Photo 2 shows a stack next to a small-scale model of a typical power plant design. The stack is only 1 1/2 times the building height, and smoke swirls downwind of the building and lingers near the ground, posing a pollution problem. This photo shows the need for tall stacks with most industrial plants.

Photo 3 shows a small-scale model of the Texas company's proposed plant. In this case, however, EPA found that a stack 1 1/2 times its height, instead of 2 1/2 times, was sufficient to carry the smoke out of the area as in Photo 1.

Dr. Snyder's experiments provided data used to permit the utility to build a shorter stack. This saved the company and its customers two thirds of the taller stack's construction costs — $10 million — while ensuring that smoke would be carried out of the area.

Check-In For Wildlife

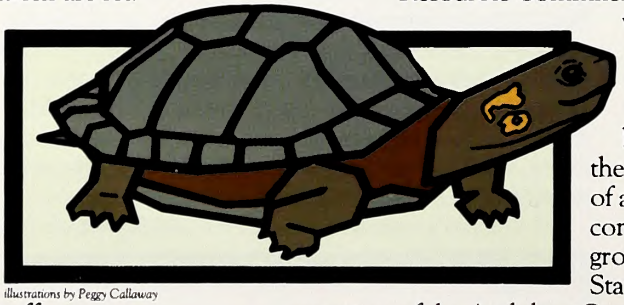
logo design by Cindy Fuguay

Twenty other states offer taxpayers an opportunity to earmark a small part of their tax refund to aid nongame and endangered species. North Carolina's wildlife could be a winner if similar legislation passes here.

By Lawrence S. Earley

It's not quite fair, is it? Take a canvasback duck and a brown pelican—two coastal birds with similar needs for food and nesting habitat, room to raise their young: scope for life, in other words.

The similarities end there, however. For when the canvasback migrates from its summer home in Canada to a North Carolina sound in winter, the hearts and minds of thousands of biologists and sportsmen—conservationists go with it. Wildlife biologists monitor the can's populations levels, work to preserve its winter habitat, create data on which fair harvest management regulations are set. Duck hunters contribute millions of dollars annually for nesting habitat in Canada. The canvasback is a game species, and sportsmen's dollars pay for year-round management efforts.



illustrations by Peggy Callaway

Brown pelicans, although impressive birds, are among the many "nongame" species. There are precious few dollars to help it and its young survive because of a lack of appropriate ways to generate money for nongame programs.

The inequities between the treatment of game and nongame species may soon be addressed if a proposed piece of legislation is enacted into law in North Carolina. This draft bill, now before the General Assembly, would create a "Nongame and Endangered Wildlife Fund." The law would create a checkoff line on the State income tax form enabling eligible taxpayers voluntarily to contribute part of their tax refund to the nongame and endangered wildlife fund.

Requested by the N.C. Wildlife Resources Commission, which would administer the program, the bill enjoys the support of all major conservation groups in the State. Representatives of the Audubon Council of North Carolina, the Sierra Club, the Nature Conservancy, the N.C. Wildlife Federation and staff of the N.C. Department of Natural Resources and Community Development assisted the Wildlife Commission in drawing up the bill.

Paul Smithson, a member of the N.C. Audubon Council who worked on the bill, is enthusiastic about the bill. "The philosophy behind natural resource management in the United States is that wildlife belongs to the public rather than to the individual landowner," he says. "Therefore the public has a vested interest in the preservation of wildlife. But except for hunters and fishermen, the public has had no way to affect wildlife management. This bill will give the non-sporting public a chance to contribute."

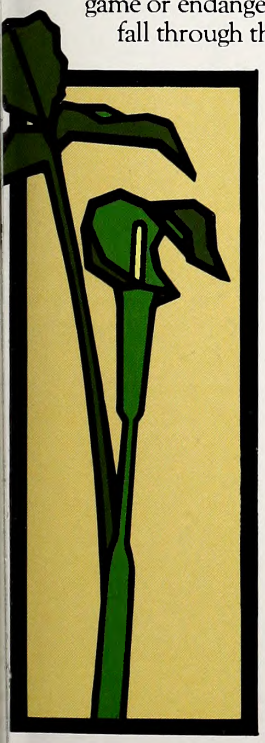
Mike Mann, executive director of the N.C. Wildlife Federation, agrees. "At the present time," he said, "game and fish have a constituency—the hunters and fishermen. Nongame animals don't have a constituency and the tax checkoff plan would create one. The bill would provide programs for the aid of nongame and endangered species, and it would provide funds to the agency best equipped to handle the work."

There is evidence that programs directed at nongame and endangered species would interest a growing number of North Carolinians. The *1980 National Survey of Hunting and Fishing* found that 93.2 million Americans, 16 years or older, are involved

with activities such as feeding wildlife, nature study, birdwatching, and providing nesting shelter to animals. Ten million Americans maintained natural areas to benefit wildlife and 12.5 million tried to improve wildlife habitat on their property. These non-sporting activities can help local economies. The survey pointed out that 62 million birders spent $517 million for bird seed and $55 million for bird feeders in 1980. A total of $1.2 billion was spent on binoculars and photography equipment whose primary purpose was for wildlife related activities.

Sportsmen are not immune to activities like these. The National Wildlife Federation also reports "a steady increase among our members in the esthetic or nonconsumptive uses of wildlife—birdwatching, photographing, sketching, and just observing animals in the wild."

The Wildlife Resources Commission has worked with nongame and endangered species in the past. Maintaining habitat for game species inevitably favors nongame species. Game management programs, for example, directed at small-game habitat also favors hawks, owls and other species. But there are many special needs of nongame or endangered wildlife that fall through the net of management programs aimed at game animals. And there are many key natural areas that need protection.



Moreover, Federal cutbacks recently have imperiled the few programs that did exist for nongame and endangered species. Concern over the past decade about faltering populations of endangered species like peregrine falcons and bald eagles spurred passage in 1973 of the Federal Endangered Species Act and, in 1980, of the Fish and Wildlife Conservation Act. But by 1983 neither of these assistance programs were funded.

"We have a golden eagle project currently underway in the mountains," said Stuart Critcher, coordinator of the Wildlife Commission's Habitat Conservation Section, "and a sea turtle project at Baldhead Island. Both of these projects were salvaged by inter-agency cooperation and funding sources other than the federal assistance acts.

"In addition, a bald eagle hacking program has been planned for Lake Mattamuskeet as a result of a $2000 gift from the N.C. Wildlife Federation."

The nongame checkoff bill would strengthen projects currently threatened, and could help kick off a variety of new nongame programs. This bill would:

—fund surveys and research on rare and threatened wildlife and their habitats;

—develop management programs for nongame and urban wildlife;

—establish recovery programs for endangered species;

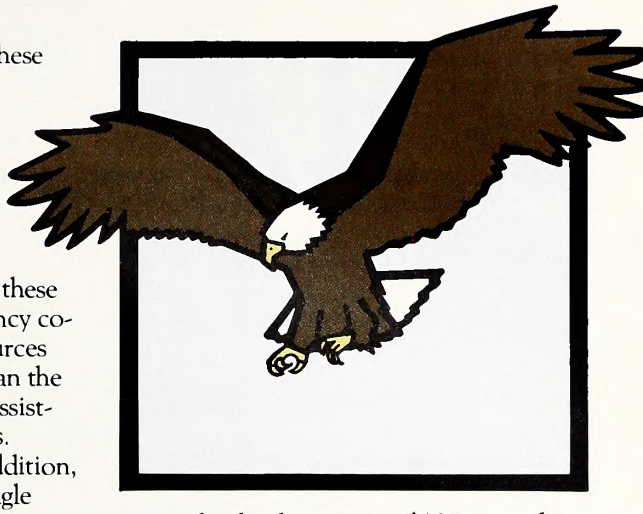
—acquire habitat for wildlife and special natural areas;

—fund public education concerning nongame wildlife resources;

—create special areas near cities for the public.

Twenty other states have passed similar versions of the tax-checkoff idea. Colorado enacted the first one in 1977, and four of North Carolina's neighbors—Virginia, South Carolina, Kentucky and West Virginia—have joined the club. According to 1982 figures provided by the Nongame Wildlife Association of North America, Colorado ranked first among the 20 states with total revenues of $692,000. Even last-place Kentucky gained $80,000 in 1982 for its nongame program and our neighboring Virginia gained $365,000 in its first year.

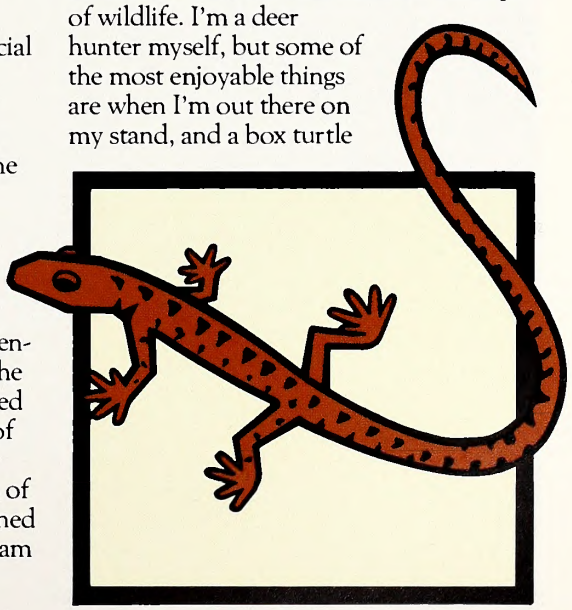
With approval of nongame legislation in North Carolina, the nongame and endangered wildlife programs might realize a windfall. Out of 1.8 million taxpayers in the State in 1982, about 79 percent



received refunds averaging $187, according to figures provided by the Department of Revenue. If 5 percent of those voluntarily contributed an average of $5, the nongame and endangered wildlife programs, virtually penniless today, would be richer by $450,000.

According to Vernon Bevill, executive director of the Wildlife Resources Commission, "The beauty of the tax-checkoff idea is that it is entirely voluntary and the fund is inexpensive to administer so that most of the money goes directly to management programs. Plus it unites sportsmen and non-sportsmen in a common cause: a strong conservation program for nongame wildlife."

Mike Mann says that the nongame and endangered wildlife tax checkoff bill is something that all sportsmen should endorse. "I think sportsmen are concerned with the total outdoor concept of wildlife. I'm a deer hunter myself, but some of the most enjoyable things are when I'm out there on my stand, and a box turtle comes crawling by, or when I'm watching a hawk at work. Game animals may take me to the woods, but it's a lot of other things like turtles and chickadees that keep me coming back."



"This early evening shot of Jockey's Ridge (below) was taken for a book I'm doing on the natural history of the Outer Banks. I like this time of the day for scenic photographs. The royal tern and her chick were taken from a blind with a 400mm Novoflex telephoto lens. By using a blind and a telephoto you can be close enough to select the parts of the scene that appeal to you. If I hadn't been in the blind, the birds wouldn't have exhibited their normal activities."

Frames From A Life

Jack Dermid has spent much of his life photographing wildlife, and many of those photographs have appeared in *Wildlife In North Carolina.* Here are some of his best.

by Lawrence S. Earley

Frame 1

Wildlife photographer Jack Dermid sits on a white camera case peering through the viewfinder of an Olympus camera fitted with a 280mm Novoflex close-focusing lens. A vagabond breeze ruffles his brown hair and the marsh grass behind him leans northeast. The salt marsh sits on a corner of Wrightsville Beach not far from the road. Dermid is photographing fiddler crabs today. Tomorrow it might be wildflowers or birds. A hazy three o'clock September sun. Kodachrome 64 film. One hundred-and-twenty-fifth of a second at f 8.

"There's a big fiddler crab. He's kind of sideways there. Maybe he's going to . . . whoops, scared him. Now he's back in his burrow. Oh, well, we've got a whole bunch. I think most of them are feeding. Look through the lens. See that female feeding. See that stuff in her mouth. Now watch her for a few minutes and you'll see that she'll lay aside a little ball of soil. She's taking organic matter from the soil.

"That's one of the things about nature photography — you really get to know something about the animals you're photographing because you're so close to them. I like all kinds of ecosystems. Anything in nature, as far as I'm concerned, is fair game for my camera.

"The light is very good today. It's sunny, but the light is soft and excellent for close-ups. Now if this were a real bright day, say an autumn day with a clear blue sky, the light would be too harsh.

"There's our crab. He's being real nice." **Click!**

"In nature a turtle is usually sitting on a sunny log, but full sunlight produces too many shadows for a good photograph. To eliminate the shadows, I placed the turtle in the shade and I used a slow shutter speed of about one second and a small aperture to get the depth of field I wanted. Such a slow shutter speed resulted in some blurred pictures when the turtle turned its head or jumped into the water, but I was always able to retrieve it."

"This Venus flytrap was growing naturally in a little bog behind my house. I photographed it in natural light with a 100mm macro lens mounted on a tripod level with the height of the plant. Most tripods don't get this low, but you can mount your tripod head on a piece of pipe and stick it into the ground and it will do quite well."

Frame 2

Flashback: Behind a tree, a 16 year-old boy holds a string attached to a camera 15 feet away. A robin flutters past the camera to her nestlings with a worm. The boy pulls the string. **Click!**

"I started out by taking wildlife pictures as a hobby. The first wildlife photograph I took was of a robin. I bought a folding Kodak for $15, and I thought I was in business. I tied a string to the shutter and rigged up a mechanism to mount the camera beside the nest and when the robin came back to the nest I pulled the string and I got my picture. I thought it was a tremendous picture. There was a lot of vibration in the rig so it wasn't really good, but it wasn't bad either. And it was enough to get me going and enthusiastic about wildlife photography."

Frame 3

Dermid squats beside his equipment case in the salt marsh. He's rummaging through his case for a rubber band. He's improvising.

"See if I can find a rubber band in here. I've purchased a remote-control radio from Spiratone in New York. I can sit 100 feet away from the camera and trip the shutter. It's supposed to be used with a flash shoe, but it looks like I didn't bring a shoe. A rubber band will hold the radio to the camera.

"I like improvising. Wildlife photography is as much engineering as it is photography. You really can't buy a lot of the things you need. Twenty-five years ago when I worked for the Wildlife Commission, instead of this radio remote-control, I'd outfit an old Speed-Graphic with a solenoid cell and trip it by remote control. Worked very well.

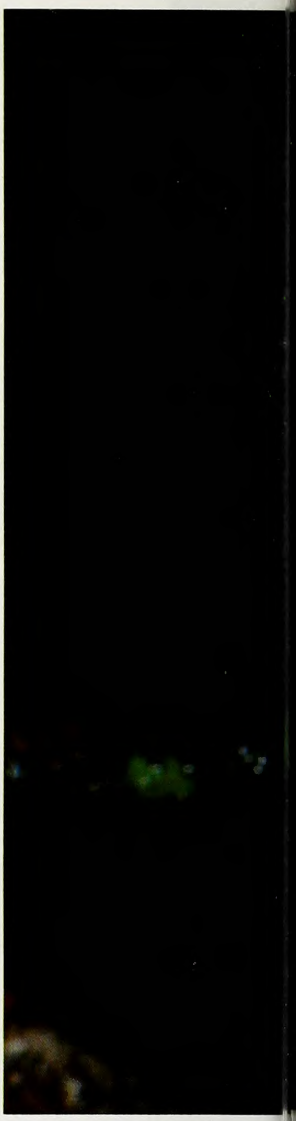
"Okay, now I'm going to put the camera by the burrow. The problem is, where will the crab be when he comes out of his hole? I'm going to put the camera with a motor drive and 55mm macro lens on a tripod and stop it down to f 11 so I'll have pretty good depth of focus. I'm going to pre-focus on a match pack beside the burrow where I expect he'll emerge."

Frame 4

Flashback: Jack Dermid in Air Force uniform, European Theater, World War II; peering through microscope in biology lab in late 1940s; shooting photographs down a dusty road with a large camera mounted on a heavy tripod.

"I got my B.S. in biology at N. C. State after the war and a M.S. from Oregon State. In 1950 I went to work for the Wildlife Commission. I was called an Educational Representative, which meant I was a jack of all trades. I was managing editor for *Wildlife In North Carolina*; I talked to civic groups; took still photographs; made some films — did just about anything that came up.

"In 1962 I left the Commission to teach biology at Wilmington College, which was what UNC-Wilmington was called then. I'm Associate Professor of Biology now. I find teaching a very rewarding experience and it complements my photography very well. I've published photographs in magazines like *Wildlife In North Carolina*, *Audubon*, *National Wildlife*, *Ranger Rick* and the old *Life* magazine. I've also had them published in National Geographic Books, Time-Life Books and Readers Digest Books. I've made four films and either co-wrote or provided photographs for two complete books. I'm currently working on a photographic book on the natural history of the Outer Banks for the University of North Carolina Press."



Frame 5

Motionless Jack Dermid perches on his equipment case, hunched slightly, holding his radio remote control. He waits and looks. Fiddler crabs by the thousands swarm across the sand like herds of stampeding wildebeest seen from a plane.

"I think patience is the key for a nature photographer. Most people can take a photograph with modern cameras. These cameras can do everything for you; some even focus automatically. The thing is, do the photographers have the patience to work out a plan and stick to it? The patience to be there when the action occurs?

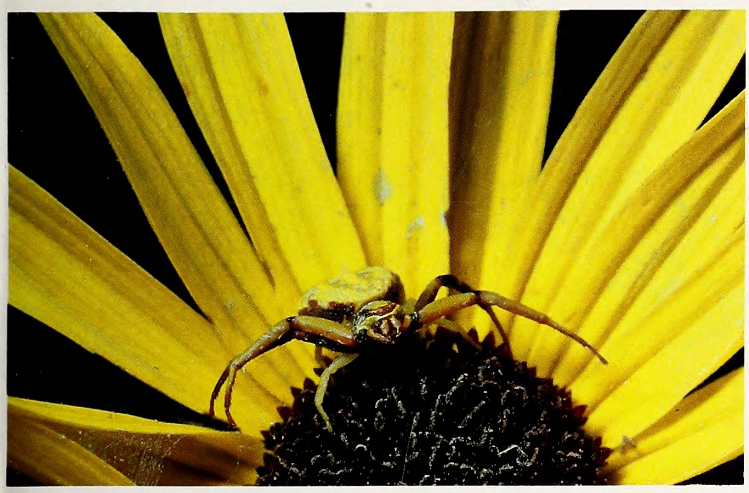
"Look at that! Now see this is one of the problems of taking photographs by remote control. We set the camera up as if the fiddler crab was going to crawl out on the left side of his burrow. But he comes out backwards and goes off in the opposite direction. Only thing to do now is chase him back in his burrow and hope that the next

time he'll come out the way we want him. Here he comes now. Same thing!

"That's the way wildlife photography is — it's a gamble. But somehow even though the fiddler crab is not cooperating one hundred percent it's nice being here. I think we're in a very pleasant place. There's a coolness in the air. You can hear the birds."

"The little grass frog on the chokeberry here is another case where I took a hard-to-photograph creature and put it in place. This frog is one of the smallest vertebrates in North America — fully grown it's only about 3/4 inch long. I used a 100mm macro lens with an extension tube, and a single strobe mounted on the lens. I shot it at f11 or f16. The polyphemus moth on the fern was taken with the same setup, but I softened the light by placing lens paper over the strobe."

"I stalked this alert whitetail deer in the Okefenokee Swamp in Georgia. They are not as wild there as hunted deer are. Stalking is a good way to get close to wildlife for a photograph. You take a slow and deliberate approach, a couple of steps at a time; take a picture or two; take a couple more steps and so on. I used a 400mm telephoto on a tripod at only 1/60 sec. with Kodachrome film. There's no way I could have taken the picture without a tripod."



Frame 6

Flashback: An eastern North Carolina tobacco field bakes in the hot summer sun. A photographer crouches in a dun-colored canvas blind. A drop of sweat launches off his brow and slaloms down his face.

"The worst day I've ever had was trying to photograph a killdeer that had nested in a tobacco field. Apparently instinct told the killdeer not to come back to the nest. The leaves of the tobacco plant shaded the eggs so that there was no danger of the eggs overheating.

"I went to the blind about eight o'clock in the morning. About four o'clock that afternoon I hadn't taken the first picture. I was getting a little impatient. In fact it wasn't until the sun began putting light on the eggs that the killdeer returned. But about 5:30 or so I was able to get some good pictures.

"The next time I photographed a killdeer I didn't go until the sun was on the nest. But I was prepared to leave quickly if the killdeer didn't cooperate. Too much sun can destroy developing eggs. You learn as you operate."

Frame 7

Not far from Dermid, along the marsh bank, an older man and a boy walk down to the creek. The man throws a net into the water and the boy claps his hands.

"If you're a nature photographer you always try to find out as much about the animal as you can. Photographing fiddler crabs today, I know that in the early part of the tide cycle, as the tide falls, they become active and they're easier to photograph. But as it gets closer to the rising tide they begin to go into their burrows. So I photograph them early in the tide cycle. If I photograph frogs, I go out on a humid rainy night rather than a hot, dry night. On a hot day the sun heats up amphibians and reptiles and they move around seeking shade. A hot sun can be deadly to them. On a cool cloudy day, you can coax 'em into reasonable position and they'll sit there because they're comfortable. You may have to use a one-second exposure, but if you have the patience you can do it. You have to wait for a snake to inhale, to expand his body fully, and then get an exposure off before he begins to exhale. That way you can get a sharp picture.

"A knowledge of biology has always been important to my photography."

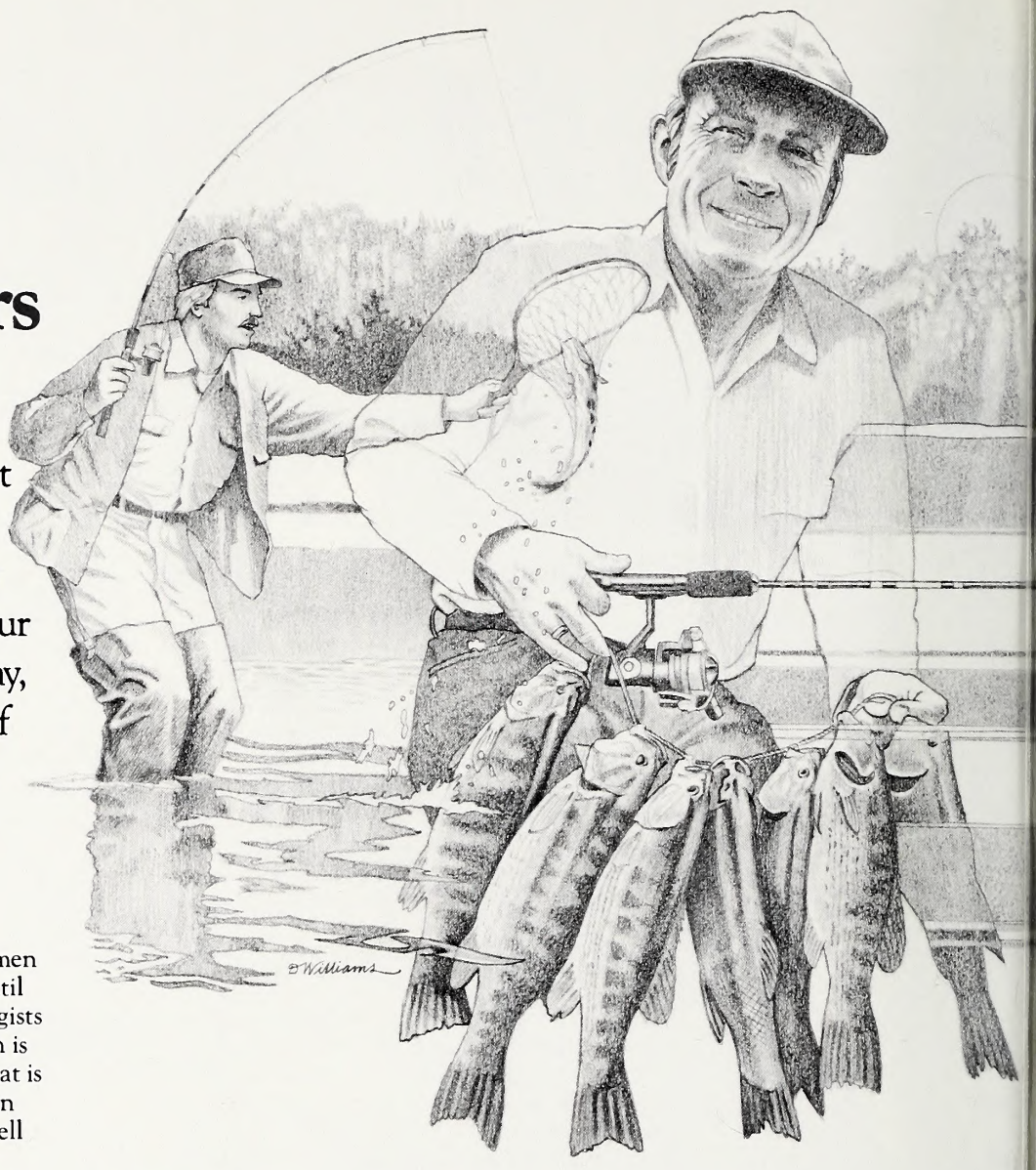
Frame 8

Tight shot of Jack Dermid's face. He exhibits the look of a man who's about to collect on a gamble.

"I believe our crab is coming out. He's in the right spot." **Click!** "We've got a picture!" **Click!** "Our radio remote seems to work. I think it'll be quite useful." **Click! Click!**

"This crab spider on a purple disk sunflower (above) was photographed in a North Carolina bog. I used a strobe with a 100mm macro lens mounted on a tripod. When you're photographing wildflowers you're almost always having to cope with a breeze and a strobe is a good way of stopping action and getting good depth of field. The eastern garter snake (right) was also taken with a strobe. I captured the snake, placed it in a setting that was comfortable for it, coaxed it into a reasonable position, and used a strobe to stop action."

The Bass Few Anglers Know



Until the early 1970s, not even fisheries biologists realized that spotted bass were native to some of our western watersheds. Today, this fish holds promise of becoming better known, and more widespread.

by Jim Dean

The fish looks so much like a largemouth bass that few fishermen know the difference. In fact, until quite recently, not even fisheries biologists knew that it was here. The mystery fish is the Kentucky spotted bass, a species that is very common in river systems that drain into the Mississippi River, and quite well known in states to the west of us.

"Of course, we've got both largemouth and smallmouth bass in our mountain lakes and rivers, but we didn't know we also had spotted bass until the early 1970s," said Bill Bonner of Franklin, special projects biologist for the N. C. Wildlife Resources Commission. "Several years after I moved to western North Carolina in 1965, some Tennessee Valley Authority biologists told us that since some of our western rivers were part of the Mississippi River drainage, we ought to have spotted bass. We checked some samples we'd already taken from some of our lakes up here and found that some of the fish we thought were largemouths were actually spotted bass."

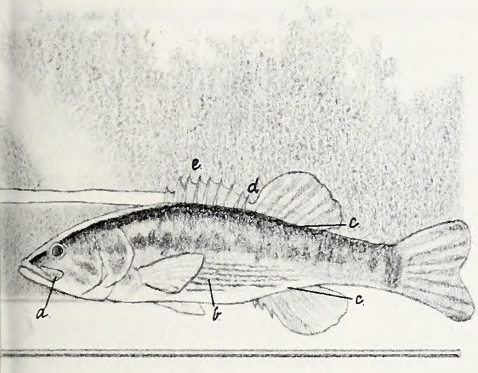
At first, the discovery was little more than a curiosity. After all, spotted bass don't get very big. Most average 12 inches or less, and the largest Bonner has ever seen was only 2½ pounds.

Most bass fishermen never realized they might be catching spotted bass along with the largemouth and smallmouth bass they caught, but a few local fishermen apparently perceived a slight difference. Bonner recalls hearing the term "native smallmouth" used to describe the spotted bass, even though spotted bass look more like largemouths in coloration.

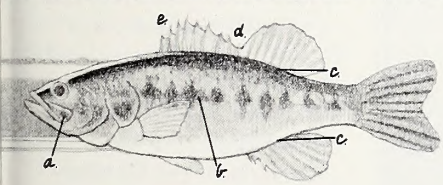
"When we began to sample, we found good populations of spotted bass in Hiwassee Reservoir and the Hiwassee River, and in Appalachia Lake," said Bonner. "We also found them in the Tuckaseegee and French Broad rivers, and they may be in the Little Tennessee and other rivers that flow into the Mississippi drainage."

Biologists initially saw no need to change their management practices for the newly discovered bass since it was doing well, but the spotted bass did offer some promise elsewhere. Joe Mickey, fisheries biologist from State Road, stocked some of the spotted bass in Kerr Scott Reservoir in Wilkes County beginning in 1977, and subsequent sampling in 1980 showed that they were doing well and even reproducing. Some fish up to 3 pounds were found, though most were 12 inches or less. Mickey has also stocked spotted bass in Rocky Creek in Iredell County, and plans to sample the creek this summer to see how well they're doing.

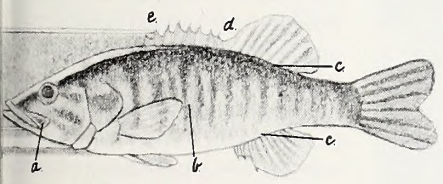
Spotted bass may also have a future in the eastern part of the State. Though they obviously do rather well in large reservoirs, they are essentially stream fish with a preference for reasonably clear medium to large rivers with a gravel or rubble bottom and fairly swift currents. Spotted bass have a preference for crawfish, but apparently do not compete directly with either largemouth or smallmouth bass. It's this last characteristic that gave biologists an idea that these fish might improve the



Spotted Bass
a upper jaw may extend to back of eye / rough patch on tongue
b horizontal streaks
c scales at base of fins
d shallow notch between fins
e longest spine less than twice the length of shortest spine



Largemouth Bass
a upper jaw extends beyond eye
b horizontal band
c no scales at base of fins
d deep notch between fins
e longest spine over twice as long as shortest spine



Smallmouth Bass
a upper jaw doesn't extend beyond back of eye / rough patch on tongue
b vertical bars
c scales at base of fins
d shallow notch between fins
e longest spine less than twice the length of shortest spine

fishing in certain streams even in the eastern part of the State.

"Back in the 1960s," recalled Lacy Nichols, fisheries biologist from Elizabethtown, "the Wildlife Commission sampled nearly every stream in the State to find out where the fishing might be improved through various types of management.

"In my area down in the Cape Fear River watershed, for example, the stream survey showed a relative absence of top predator gamefish — especially largemouth bass — in some streams," said Nichols. "Since some of these upper Coastal Plain streams were similar to smallmouth bass streams, we thought it might be possible to stock smallmouth there.

"This idea wasn't followed up, however, until a further study was made in the mid-1970s of four streams located in Harnett, Cumberland and Moore counties," said Nichols.

The four study streams were Upper Little River, Lower Little River, Parkers Creek and Advents Creek, all tributaries of the Cape Fear River not far from Lillington. Following the 1975-78 study of these streams, a decision was made to stock them with spotted bass.

"During the period from 1978 through 1981, about 310,000 spotted bass fingerlings were stocked," said Nichols. "Since these fish do not spawn until they are two or three years old and have reached a length of about 8 inches, we anticipate that these fish ought to be reproducing now if the stocking has been a success, and we began looking for evidence of reproduction in 1983 and will continue to do so this summer."

Although it's too early to tell at this point whether the spotted bass stocking in these creeks will be a success, Nichols is hopeful that it will. If so, it may mean that spotted bass will be considered for stocking in other suitable streams that now lack top predator gamefish.

Already the discovery of spotted bass has created one change in fishing regulations. Spotted bass are under the same regulations as smallmouth with a minimum size limit of 12 inches. The minimum size limit for largemouths is 14 inches except in the 12 counties where it is only 12 inches. Those 12 counties are Cherokee, Graham, Clay, Macon, Swain, Jackson, Haywood, Transylvania, Madison, Buncombe, Henderson and Polk. For all black bass species, however, two of the eight fish in the allowed creel can be smaller than the minimum size limit. Since in some areas, smallmouth and spotted bass have a different minimum size limit from largemouth bass — and since spotted bass so closely resemble largemouths — anglers need to be able to distinguish these species. Therefore, current regulations include bass identification charts to help.

"There are a number of differences shown in the charts, but when it comes to distinguishing a spotted bass from a largemouth, one of the best ways is to check the fish's tongue," said Bonner. "Spotted bass — and smallmouth bass — have a rough patch of 'teeth' on their tongues, and largemouth bass don't have this. Most fishermen can already tell the difference between spotted bass and smallmouths since their coloration is usually quite different, so if you catch what looks like a largemouth and find that your fish has a rough patch on its tongue, you've caught yourself a spotted bass."

Bonner also adds another bit of little-known bass lore to the whole subject of bass species found in North Carolina. There is another species of bass that is found here, but only in one place. "Hardly anyone knows it, but we've got Coosa bass in the Horsepasture River below Windy Falls in the southwestern part of the State," said Bonner. "These fish are called redeyes in Georgia where they are more common, and they are close kin to the spotted bass." Coosa bass shouldn't be confused with either rock bass or Roanoke bass, both of which are also called "redeyes," in North Carolina.

The next time you fish a mountain reservoir or one of the rivers known to hold spotted bass, check your catch carefully. Chances are you may have caught a fish that was a mystery here until recently, and your catch may even be a new State record. The current record is only 14½ ounces for a spotted bass caught by Robert Dyer in Hiwassee Reservoir in 1980. Since both Bonner and Mickey have seen larger ones, that record may not be tough to beat.

And if you fish streams in the East where spotted bass have been stocked, take a moment to check any "largemouth" bass you catch. It just might be a spotted bass. They're not — pardon the pun — all that hard to spot. Just feel the tongue.

Native Wildlife Is Best

Written and Edited by Mark Taylor

"Ask a Biologist" is a regular feature which appears in *Wildlife In North Carolina.* The author is Carl Betsill, a Wildlife Commission biologist who specializes in small game and urban wildlife.

Question: I've heard that Texas has fantastic hunting for African animals on exotic big-game ranches. Could that be done here in North Carolina, or would it harm our native wildlife?

—*J.W.C.*
Raleigh

It seems that the grass is always greener on the other side of the fence. For generations, sportsmen have envied the game animals available in other parts of the world. Instead of enjoying our rich heritage of native game animals — and spending time and money protecting and improving habitat for these species — resources have been wasted trying to establish exotic animals in North Carolina. Almost without exception, these stocking attempts have failed.

Take the pheasant, for example. The success of the pheasant in other parts of the country gave hope that the birds would thrive in North Carolina. From 1928 until 1933, nearly 5,000 pheasants were raised and stocked from State Game Farms in North Carolina. Except for a few isolated populations on the Outer Banks, these attempts were futile. Other exotic game birds which were released — but did not do well — include Formosan, Kalij and melanistic mutant pheasants, chukar, Hungarian partridge, and the Coturnix, Gambel's and California quail.

Jack Dermid

Grass Is Greener: *Generations of Tar Heel sportsmen have appreciated our native game species — including the cottontail rabbit, quail and others. Yet, some sportsmen feel that hunting could be improved by importing exotic species from other regions. Most of these attempts are dismal failures. For example, western jack rabbits were stocked extensively in North Carolina in the 1930s and 1940s, and failed to survive.*

Rabbit hunters have also gotten into the act. Numerous attempts to introduce jackrabbits to North Carolina have failed. In 1936, 16 jackrabbits were introduced in eastern Orange County. In the mid-forties, jackrabbits were released on a 15,000-acre game preserve near Pinehurst. And in 1949, 75 jackrabbits were released in Davidson County and 15 in Avery County. Despite the Wildlife Commission's attempt to discourage the practice, biologists believe that individuals imported jackrabbits from Idaho into the State in 1981. San Juan rabbits — and other subspecies of cottontails from Kansas and Missouri — have also been introduced to the State at various times.

In the past, the Wildlife Commission has aided in many stocking attempts. Today, however, biologists are more reluctant to introduce an exotic animal into the environment. True, some introductions have been successful — but often the exotics become serious pests. Animals that are stocked into a new environment sometimes have no natural enemies or diseases to help control their numbers. Also, they may compete with native species in ways that are not anticipated. For example, English sparrows often take over nesting cavities which are used by native bluebirds. The exotics carry diseases or parasites that could harm native wildlife.

Because of the high risks of stocking exotics — and the low chance of success — the Wildlife Commission is cautious about supporting any additional stockings of exotic animals. Permits to bring exotic animals into the State for stocking in the wild are usually denied — unless there is substantial evidence that these stockings will not harm native wildlife. North Carolinians enjoy a rich and diverse wildlife resource — it is much too valuable to risk losing

Deer To Her Heart

Irene Vandermolen

A Delectable Resource: *Over 38,000 deer are harvested by Tar Heel hunters annually, and countless meals of venison are served in Carolina kitchens. Wild game is not only very tasty, but high in nutrition. The secret, however, is in the preparation — be especially careful not to over-cook wild game.*

"To eat venison or not to eat venison?" That was the question posed to me by a neighbor one day last fall. There he was, standing in the doorway asking if "ya'll want a piece of deer." Being a jellyfish about these matters, I summoned all my courage and casually said, "Sure do." He beamed with pleasure. Soon I was standing there with an armload of dead deer — the biggest chunk of meat I had ever seen. Store prices being what they are, I tried to smile.

I come from a long line of non-hunting squeamish eaters. Anything stronger — or wilder — than chicken is suspect. I kept some venison out for supper, and turned to my trusty *Joy of Cooking*. I found a number of recipes that would disguise the meat — cooking with green peppers and onion, stewing in wine, and so forth. But, casserole beef with dried fruit won out. The recipe called for two cups of mixed dried fruits plus the juice and rind from one lemon — not to mention the two teaspoons of curry that should render the venison harmless.

The next step was to turn on the exhaust fan in the kitchen — which would prevent the house from smelling like a herd of deer had passed through. Then, I diced and browned the meat. I kept waiting for a wild odor to explode from the frying pan. Instead, I was greeted with a delicious, mild, beefy smell — and I knew supper would be a success.

I cooked the dried fruit, but decided not to ruin the venison with it. Instead, I dashed up a little brown gravy with onions, and put on a feast the family wouldn't forget. Everyone asked for seconds — and I have big plans for the rest of that venison sitting in the freezer!

— Mrs. Guy Whitford
Plymouth

Editor's Note: This story shows that wild game, properly prepared, is delicious — even to those who don't take to the idea of eating a wild animal. Nutritionists have also found that wild game is generally higher in protein and lower in fats than domestic meats.

Book Review

The Mysterious Carolina Bays, by Henry Savage. Published by the University of South Carolina Press, Columbia, South Carolina 29208. Hardcover, 102 pp. $14.95, including mailing.

How were the Carolina Bays formed some 50,000 years ago — those mysterious, sand-rimmed craters which dot the southeastern Coastal Plain? American Indians believe that the bays were formed when huge whales scooped out pools with their tales when they were stranded in the midst of a shallow sea. Geologists believe that a complex relationship between soil types and groundwater flows may have formed the bays. Astronomers believe that a meteor shower may have been responsible.

Savage explores the strengths and weaknesses of all these in this book, and gives detailed information on the physical and natural characteristics of the bays. Not surprisingly, this book is at times quite technical but it is still very interesting. Savage concludes with yet another fascinating theory on the formation of the bays — but you'll have to read the book to find out what it is!

Check That Croaker

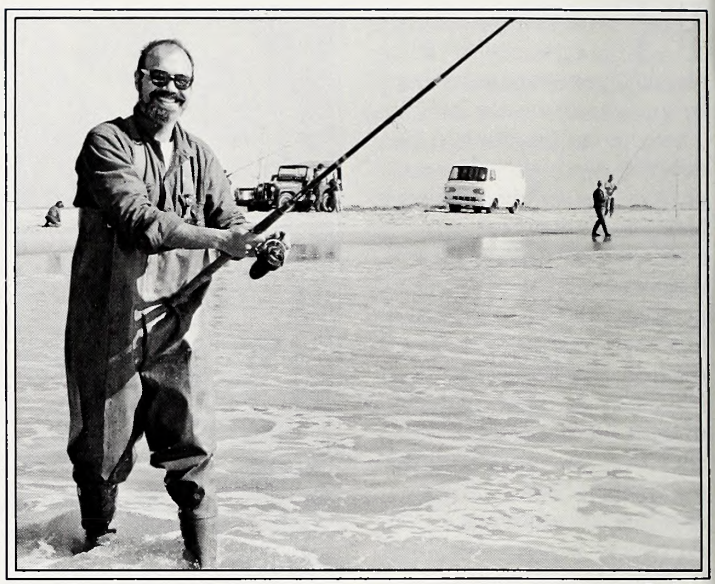
Take a close look at any croaker you catch — if it has the right tag, it could be worth $500.

That is the first prize in a drawing to be held as part of a study of croakers by the N.C. Division of Marine Fisheries. The croaker is North Carolina's most important marine fish for sport and commercial fishermen. Record croaker catches of 15 to 21 million pounds annually were landed by North Carolina commercial fishermen from 1976 to 1980, although the commercial catch fell to 11 million pounds in 1981. The sport catch of croakers is also significant — a 1979 survey estimated that recreational fishermen caught over 1 million pounds of croakers annually.

"We're trying to learn more about croaker populations, migrations, and harvest rates through this tagging study," said Douglas DeVries, a fisheries biologist with the N.C. Division of Marine Fisheries. "As part of this study, we plan to tag 50,000 6- to 8-inch croakers each fall for three years. At this point, the fish are about one-year old, and we know that they are native to North Carolina estuaries. Through tag returns from larger fish, we hope to learn whether most croakers from North Carolina are caught in or out-of-state, how much they migrate, and whether different populations of fish are involved."

Most of the tagging has been done in southern Pamlico Sound — at Swanquarter and Rose bays in Hyde County, Goose Creek and Jones bays in Pamlico County, Adams Creek and the Newport River in Carteret County, and near Hatteras in Dare County. Fish will also be tagged and released in the northern Pamlico Sound and near the Cape Fear River.

Anyone catching a tagged croaker should send the tag to the N.C. Division of Marine Fisheries, P.O. Box 769, Morehead City, N.C. 28557.



Tom Jackson

Keep An Eye Out: *Coastal fishermen should watch for tagged croakers. As part of a study of the croaker fishery, the Department of Marine Fisheries has tagged thousands of croakers and is offering rewards for all returned tags.*

All anglers will receive a $2 reward, and be eligible for additional prizes in the drawing. With the returned tag, please include your name and complete mailing address, location where the fish was caught, length of fish, date of capture, and gear used in capture.

Record Barracuda Caught

Many record fish have probably been cooked and eaten — and a few may even have been thrown back in the water. At least, that's what almost happened to the new state record barracuda which was caught last fall by Mrs. Colleen Williams of Mooresville.

"We were bottom fishing for king mackerel from a charter boat about 18 miles off Cape Hatteras when I caught the fish," said Mrs. Williams. "The fish hit on cut-tuna, and it fought for about 15 minutes before I brought it to the boat. We debated on whether to turn the fish loose, and my husband Harry finally decided we should keep it — which was lucky for us."

The barracuda was a new record at 57 pounds. It was 52½ inches long, and had a girth of 20 inches.

Mrs. Williams and her husband are avid anglers, and enjoy fishing for flounder at the coast. They also fish for crappie, largemouth bass and stripers at nearby Lake Norman.

Problem Is Serious

Public Rates Acid Rain

North Carolinians are familiar with acid rain — and they don't like it. This is the result of a public-opinion poll recently sponsored by the North Carolina Wildlife Federation and the National Wildlife Federation.

The project was part of the Carolina Poll, a survey of public opinion in the State conducted by the University of North Carolina School of Journalism. A random sample of telephone numbers was used.

Of those polled, 44 percent considered acid rain a serious problem and 24.6 percent considered it very serious. Of those who considered acid rain a serious problem, 83 percent favored additional controls on power plants even if their utility bills rose. These opinions were shared by young and old, rich and poor, and republicans, democrats and independents. Other factors being equal, 44 percent of those surveyed also said that a congressional candidate's position on acid rain could change their vote.

A Most Elegant Fish

For a treat, fish the upper reaches of North Carolina's high mountain streams. The trout you'll catch are mostly wild, stream-bred fish — bright of color and firm of flesh. Pop them in the frying pan with a layer of cornmeal and a little bacon grease while they're still flopping, and you'll have a backwoods breakfast fit for a king. But, if you wait — the situation changes. A fish fry may be fine for bream, but there's something elegant about trout that demands special treatment. The fine chefs of Europe cut their teeth (culinarily speaking) on this fish, and dining on trout sauteed in butter, baked with wine-and-almond sauce, broiled with mushrooms, or pan-fried Grenoble is truly a class act.

In this classic tradition, we offer the following recipe for trout. Originating in Hungary, the recipe is worthy of any fish that you lure from the emerald pools or rushing shallows of a Carolina mountain stream.

Sauteed Brook Trout

4 trout, cleaned (5- to 7-ounces each)
1/4 cup flour
salt and pepper
6 tablespoons butter
3 tablespoons cooking oil
1/4 cup coarsely chopped English walnuts or sliced almonds
juice of 1/2 lemon
2 tablespoons finely chopped parsley

Wash trout well, pat dry. Combine flour, salt, and pepper; dredge fish in mixture. Heat 3 tablespoons of butter and oil in a large, heavy skillet until foam subsides. Add trout, and cook 4 minutes over medium-high heat. Fish should be well-browned. Turn over, and cook until fish flesh flakes easily. Carefully transfer the fish to a warm platter.

Pour off any fat remaining in the pan, and wipe the pan with a paper towel. Add remaining butter, and melt over low heat. Add the chopped nuts, and saute for 3 minutes. Add lemon juice and parsley, and pour the sauce over the fish. Goes well with boiled or steamed potatoes.

— *Curtis Wooten*

In Hunter Safety
Good Show

North Carolina has one of the best hunter-safety programs in the country. That's the word from the International Association of Fish and Wildlife Agencies, which recently presented the Wildlife Commission with a Certificate of Merit in recognition of its outstanding hunter-safety program.

"We're very pleased with this honor," said Gene Abernethy, chief of the Wildlife Commission's Division of Enforcement. "The dedication of the volunteer instructors and our own staff have helped make this one of the most successful hunter-safety programs in the nation."

The Wildlife Commission's voluntary hunter-safety program began in 1972, and over 240,000 students have graduated from the program.

A Good Map

Wildlife buffs are in luck — the U.S. Fish and Wildlife Service recently published a "Visitor's Guide to the National Wildlife Refuges."

Most of the nation's 413 national wildlife refuges are depicted on this handy, pocket-sized map of the United States, which also shows major interstate highways. Refuge addresses and activities featured at each refuge are listed on the back.

The "Visitor's Guide to the National Wildlife Refuges" is available for $2.25 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Specify stock #024-010-00529-7 when ordering.

Fish The Creek Mouths
Smallmouths In Spring

If you'd like to catch a hefty smallmouth bass, April is one of the best times to fish. Many large smallmouths — some weighing up to 5 pounds — are taken at this time of year.

"During April, smallmouths often gather in shallow waters near the mouths of streams and rivers in Mountain lakes," said Jay Davies of Sylva, a Wildlife Commission education field representative, and an avid angler. "Some of these fish are properly spawning — smallmouths spawn earlier than largemouth bass. The fish are also probably seeking warmer water in the shallows, and are taking advantage of the large influx of food provided by the spring runoffs."

Davies adds that fishing is best in the morning and evening, and the fish bite well on silver Rapalas and other lures which imitate flashy bait fish.

Use A Chart
The Right Fly

Matching the hatch is not usually necessary to catch trout in North Carolina streams — but there are times when it pays off, especially on streams with rich insect life. Choosing the correct fly, however, can be tough for the novice — and even some old-timers.

Trout Unlimited with the assistance of member Troy Dodson, of Asheville has prepared a handy, waterproof, pocket-sized fly-emergent chart for the Southern Appalachians. This chart shows which insects are emerging on streams at particular times of year, and what sizes and patterns of flies best match the hatch. All profits from the sale of these charts go to Trout Unlimited to be used to improve trout fishing.

Charts may be ordered by sending $3 to Trout Unlimited, Box 117, Asheville, N.C. 28802.

North Carolina Calendar of Events

April 1-2
5th annual Newport Pig Cookin' Contest at Newport. For more information contact Ann Howard, P.O. Box PIG, Newport, N.C. 28570.

April 7-10
North Carolina Azalea Festival in Wilmington.

April 10
9th annual Gardener's Sunday at the Tryon Palace in New Bern. Gardens are open free, and many special displays are featured.

April 13-17
Grifton Shad Festival in Grifton. Fishing contests, fish fry, canoe races, dancing, arts and crafts, and other activities.

April 15-17
Dogwood Open Trapshoot at the Pinehurst Hotel and Country Club Gun Club in Pinehurst. For more information contact the Pinehurst Hotel Gun Club, P.O. Box 4000, Pinehurst, N.C. 28374.

April 15-17
Spring Expo '83 at the Collett Street Recreation Center in Morganton. Horticultural exhibits, and arts and crafts. For more information contact H. Leslie Miller, Box 949, Morganton, N.C. 28655.

April 16
36th annual Steeplechase Race at Stoneybrook Farm in Southern Pines.

April 16-17
"Firehouse Jubilee" at Poplar Grove Plantation in Wilmington. Displays of antique fire engines.

April 17
Wild Foods Festival at the Schiele Museum in Gastonia. Learn how to prepare dishes from edible wild plants. For more information contact the Schiele Museum, P.O. Box 953, Gastonia, N.C. 28052.

April 17-18
Pioneer Living Day at the Vance Birthplace in Weaverville.

April 30-May 1
Mayo River Races in Madison. Whitewater races for open canoes and kayaks. For more information contact Ben Matkins, 508 Woodlawn Avenue, Greensboro, N.C. 27401.

April 30-May 1
Dixie Division Open Canoe Championships on the Nantahala River. For more information contact the Nantahala Outdoor Center, Box 41, Bryson City, N.C. 28713.

April 30-May 8
Wilmington Bicycle Festival in Wilmington. Various rides and entertainment. For more information contact Bob Jamieson, 1804 Market Street, Wilmington, N.C. 28403.

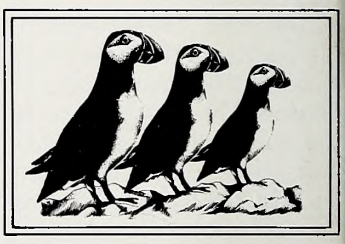
The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the Sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status On Jan 31, 1983

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	3746	$1,081,662.70
Lifetime Hunting License	50	8,222.63
Lifetime Fishing License	102	16,645.82
Lifetime Subscriptions to Wildlife In N.C.	131	13,849.95
Contributions	—	13,320.32
		Fund Total: $1,133,701.41

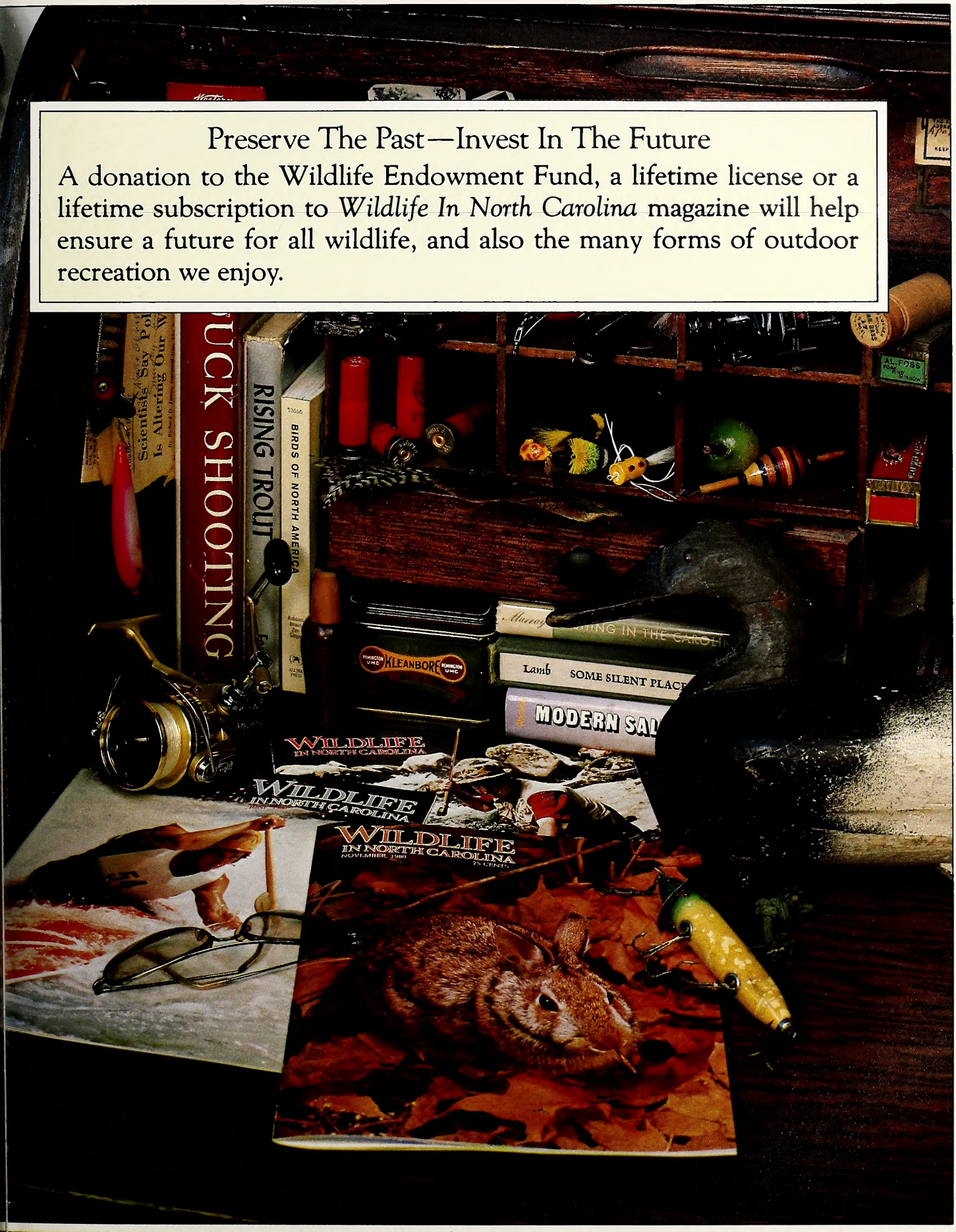
Puffin 54



After almost a century of absence, puffins have once again nested on the Maine coast, reports the National Wildlife Federation.

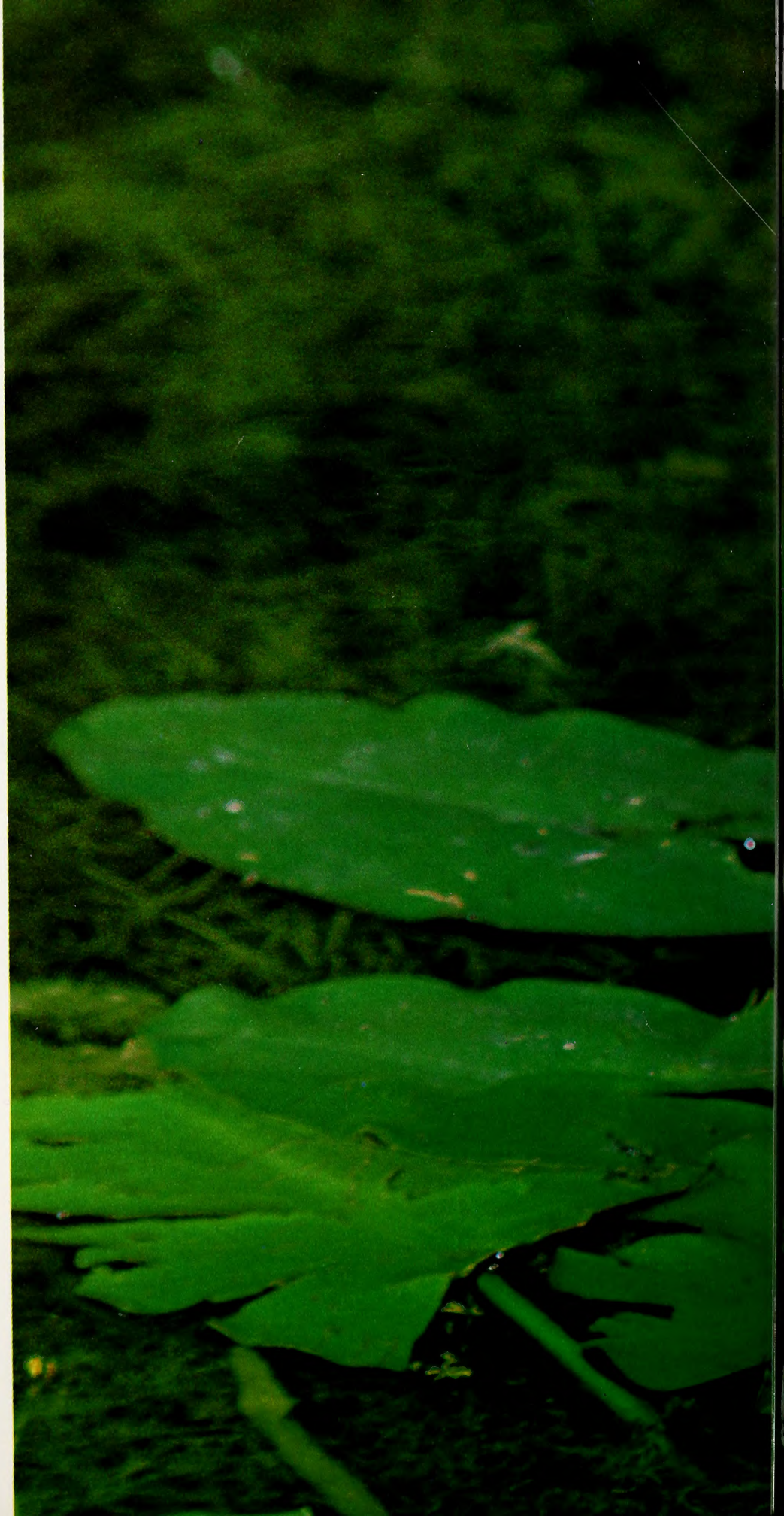
The puffin — a colorful shore bird once common to the New England coast — has not nested in the United States in almost 100 years. During the 19th century, eastern Egg Rock Island in Maine, a major nesting site, was discovered by market hunters. Puffins were killed for meat and fishing bait. Eggs were stolen, feathers were used for pillows and mattresses, and wings were used to decorate ladies hats.

By 1902, only one pair of puffins was left on the island, and those soon disappeared. In recent years, however, the National Audubon Society has re-established puffins on eastern Egg Rock Island using birds captured in Newfoundland. Dr. Stephen Kress, the project leader, dug dens for the 10-day old chicks and fed them raw fish twice a day. Young birds were used so they would learn to identify with their home island, and would eventually return to nest — after spending four years on the open sea. Puffin number 54 returned to nest last spring, and hatched the first baby puffin the country had seen in this century. Other birds soon returned, and 11 pairs of puffins nested on the island in 1982. Puffins will probably be restored to other islands off the Maine coast in the near future.



Preserve The Past—Invest In The Future

A donation to the Wildlife Endowment Fund, a lifetime license or a lifetime subscription to *Wildlife In North Carolina* magazine will help ensure a future for all wildlife, and also the many forms of outdoor recreation we enjoy.



Wildlife photographer Jack Dermid used a 400mm Novoflex lens to photograph this purple gallinule in the Florida Everglades. "The bird literally performed for me," the Wilmington photographer said. "It assumed almost every conceivable pose, and I got off about 25 shots before it flew away." For more of Dermid's frames from nature, turn to page 20.

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WILDLIFE IN NORTH CAROLINA

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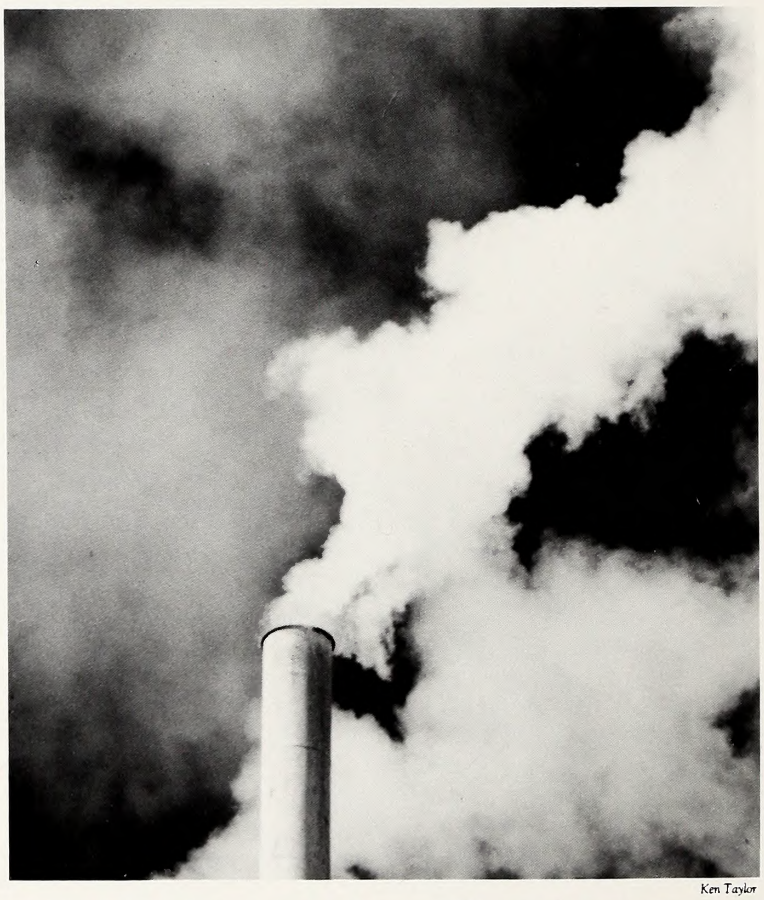
Simple Solutions: A Contradiction In Terms?

by Jim Dean

I suppose we could all be forgiven if we occasionally offered a simple solution to a complex problem. Never mind that it might not work — or turn out to be a bit less than simple (stupid, perchance?). The impulse remains, and I will share three with you that I heard recently.

First, there was the grizzled old gentleman who stood up in a public meeting at a water pollution hearing. He had listened to all sides. Industries talked of lost jobs, diminished economy and all the other disasters that would be wreaked upon us should we be so unwise as to cause them to reduce the amount of pollution that they were contributing to a river. Biologists told of lost fish and wildlife, resources that also contributed to the economy. Health authorities bespoke plague, and most of us sitting in that hot county courthouse felt a growing sense of helpless rage.



Ken Taylor

Not so our wise friend. "I been hearing all this stuff now going on two hours, and I think I got the solution," he said. "Just write it up in the law so that every industry, every water polluter, is required to place its intake pipe 100 yards downstream from the outflow pipe. That oughter do it."

Indeed it oughter. Some people laughed, the industry-sponsored folks a bit nervously, I thought. But nobody said it wouldn't work.

Then there was another gentleman who was amused by the idea of raising trout and carrying them to a stream where somebody could catch them. "What you wildlife folks need to do is let people fish in the hatcheries," he wrote me. "You wouldn't have to go to the trouble and expense to tote all them fish out to Heaven knows where, and the fishermen wouldn't have to get up before dawn and waste a lot of gas to get to the stream in time to find a rock to stand on. On the stream I fish, you got to bring your own rock nowadays. Also, your uniformed wildlife guys could walk down the line of fishermen and check licenses, and the trout streams could grow their own trout. Now you tell me what's wrong with that?"

Gee, maybe you better tell him. I couldn't think of anything wrong with it to save my life. My job, perhaps, but not my life.

Things, of course, come in bunches — good fortune, bad luck, bright ideas and bananas — so it stands to reason that I would be confronted with a third simple solution while I was still mulling over the first two. As you have no doubt noticed, there is a big squabble going on over acid rain. Canada is irate that the U.S.A. is exporting acid rain across the border where it is killing fish, affecting crops and tree growth, eating away at buildings and perhaps corroding lungs. Of course, we're keeping plenty for ourselves. There are already several hundred dead lakes in New York State, and acid rain is a big problem throughout most of the east, and especially in the northeast. Even in North Carolina, some of our rain has been as acidic as vinegar.

A goodly percentage of acid rain is generated from utilities and other coal-burning industries in the Ohio River Valley and other parts of the midwest. Sulfur dioxide from stacks over 1,000 feet tall is propelled high in the atmosphere where it changes into sulfuric acid and falls with the rain.

Trouble is, it falls hundreds or thousands of miles away because of those tall stacks. And the tall stacks were developed to meet pollution standards, it being cheaper to airmail pollution COD to unsuspecting neighbors, not to mention harder to prove.

"Whatever happened to the old notion that if you foul your own nest, you ought to be expected to sit right in it?" asked a letter writer. "We wouldn't have a widespread acid rain problem if they'd chop about 990 feet off those 1,000 foot stacks. That way, the people who produce the pollution and those who most greatly benefit from its production would have to deal with it right there. You tell me, Sir, isn't that rational?"

Plugged me again. Center shot, too. I could write and tell him that it has to do with overall economics measured against the loss of Canadian good will, eroding buildings, stunted plantlife, and a few hundred dead lakes, but he wouldn't buy that. And I'm not sure I want to sell it.

Simple solutions. In spite of everything, they keep cropping up and complicating things. Oh, for a simple solution to anything that could be quickly applied with unanimous agreement. If I think of just one, I'll let you know. Meanwhile, I'm going to stop on the way home and buy an ice cream cone. Humm, 31 flavors to choose from, you say.

May, 1983
Volume 47, No. 5

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and Community Development

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

CONTENTS

4 **Goldens In The Hills** *by Curtis Wooten*
Golden eagles are being reintroduced to our mountains in the Shining Rock area.

9 **Life On The Tournament Trail** *by Mark Taylor*
Professional bass fishermen may have more in common with pro golfers than they have with the average angler.

14 **Three Ways For Cobia** *by Joel Arrington*
These hard-fighting salt water fish are excellent eating. Here are three proven ways to catch them.

18 **A Plot To Save Plants** *by Lawrence S. Earley*
Many of our native plant species are growing on this 350-acre plot at North Carolina's Botanical Garden.

24 **Return Of The Bluebird** *by Mike Overton*
These colorful songbirds are making a comeback, but they still have a long way to go to reach pre-World War II population levels.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

Back Of The Book *by Mark Taylor*

Front Cover *Well-known bird and wildlife photographer Karl Maslowski set up this photo of an eastern bluebird eating a berry.*

Back Cover *Someday there may be golden eagles soaring over these mountains, and young birds have already been released in this area. Photography by Curtis Wooten.*

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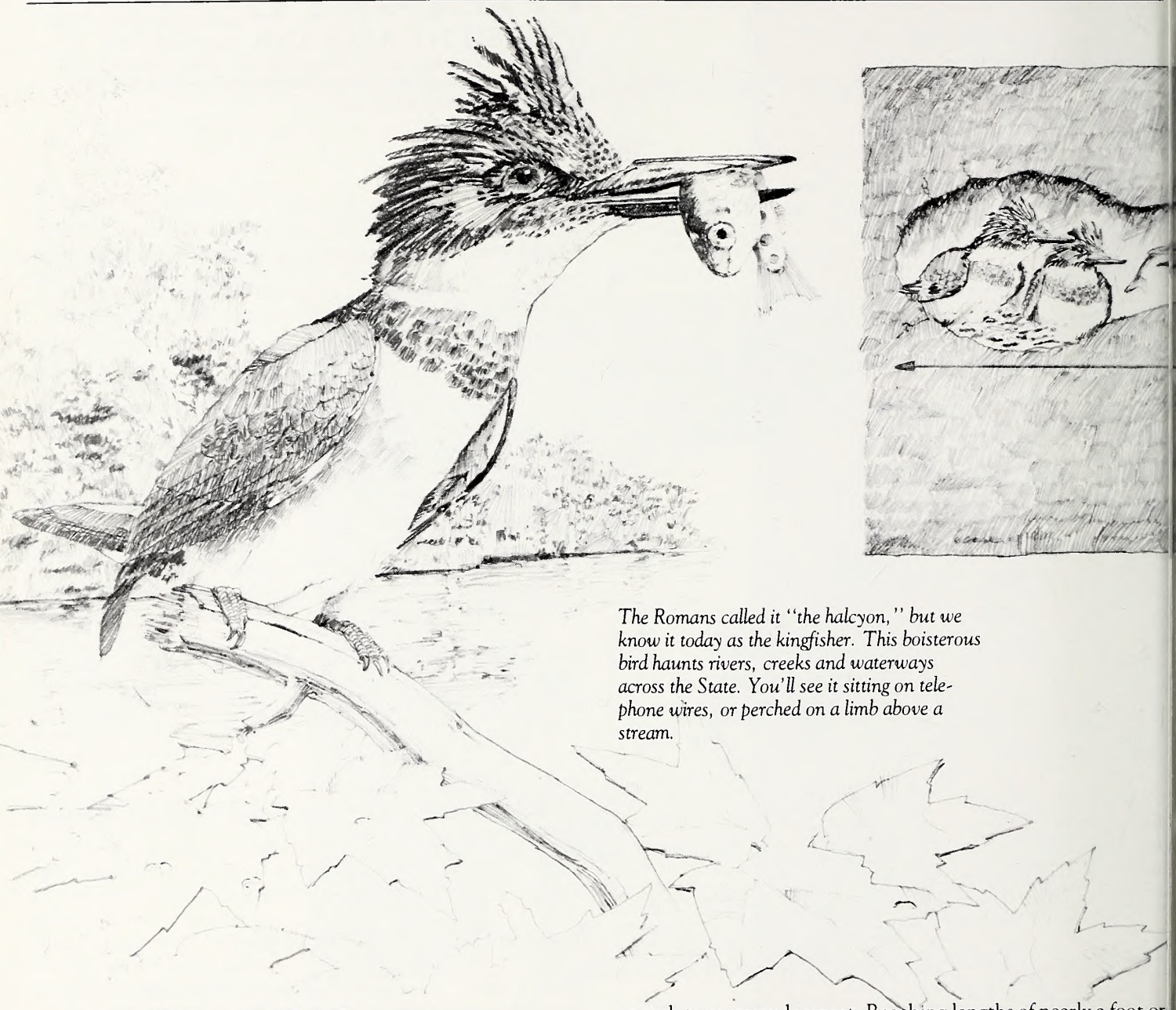


The Romans called it "the halcyon," but we know it today as the kingfisher. This boisterous bird haunts rivers, creeks and waterways across the State. You'll see it sitting on telephone wires, or perched on a limb above a stream.

King Of The River

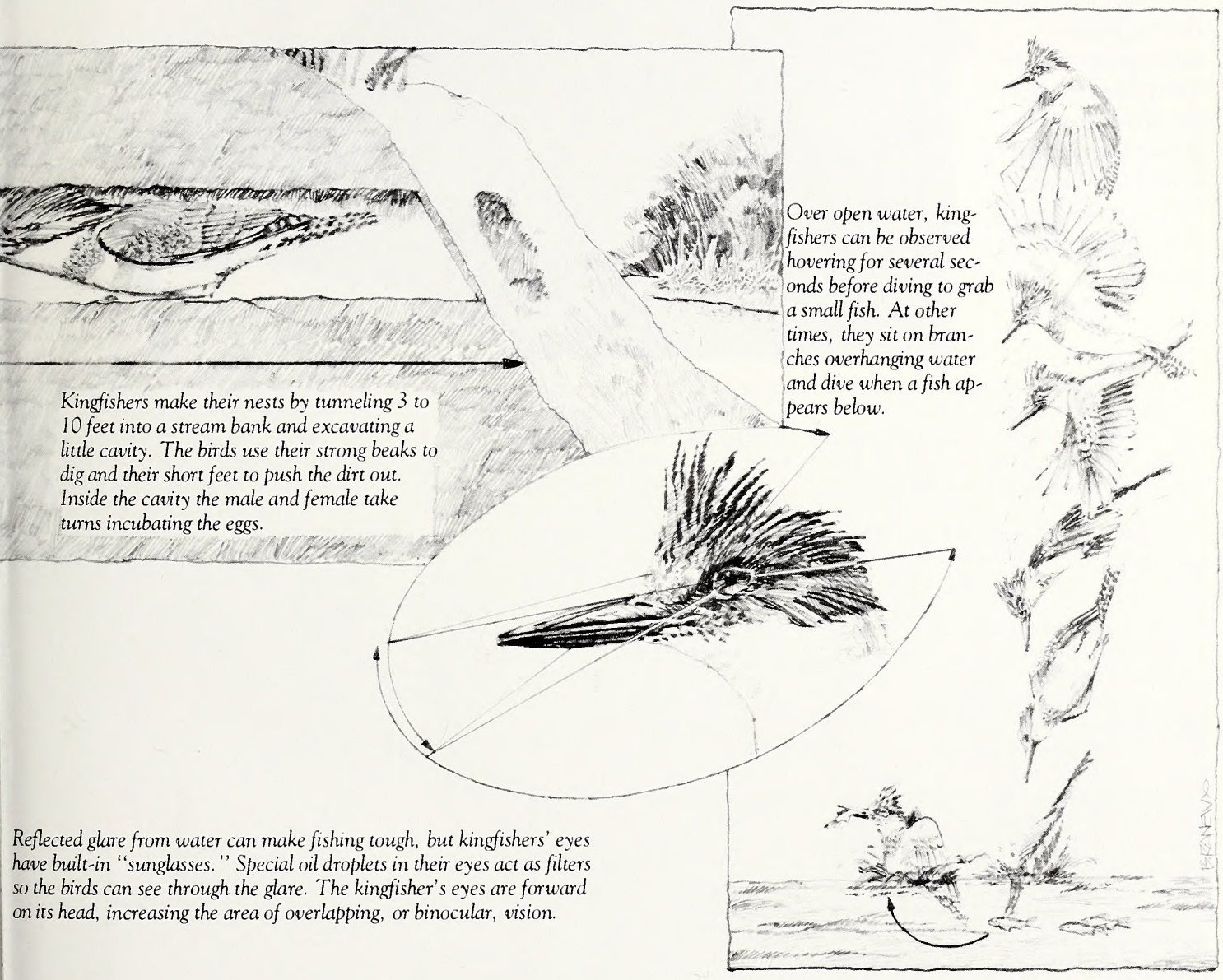
by Lawrence S. Earley/illustrated by Bob Ranew

Look for that bolt of blue as you canoe a stream this summer, a big bird that shoots ahead of you and alights on a further perch along the streambank. Kingfisher! Off he darts again. The way he leads you on and then disappears, it might seem he's protecting nesting young somewhere. But if that were the case, the bird wouldn't act as a decoy. It would turn into a feathered kamikaze, until you paddled out of its territory.

The kingfisher is simply used to having its own way, you see. Perhaps it's the regal crest atop its head that gives it such boisterous confidence. Or perhaps it's the size of the bird. It's big enough to command respect. Reaching lengths of nearly a foot or more, with a long, stout bill, the kingfisher is a formidable bird to deal with. Both the male and female are similarly colored, with blue coats, white throats and chests which sport a blue collar bar. With a cinammon splash across her chest, however, the female has the gaudier dress.

The Romans believed that the kingfisher, which they called the "halcyon," nested at sea at the time of the winter solstice, and that while the bird incubated its young the sea would grow calm. Those tranquil days were called "halcyon days," treasured by sailors. For two thousand years or so halcyon days have suggested a time of calm and peace, or as the Roman writer Pliny described them, "days devoted to pleasant outings in woods or fields or along ocean beaches, or to paddling up some quiet river, all the while learning to know the trees and wild flowers, and the songs and forms of birds."

Of course you can paddle your canoe along a stream during your own halcyon days, and if you're lucky you may come to



Kingfishers make their nests by tunneling 3 to 10 feet into a stream bank and excavating a little cavity. The birds use their strong beaks to dig and their short feet to push the dirt out. Inside the cavity the male and female take turns incubating the eggs.

Over open water, kingfishers can be observed hovering for several seconds before diving to grab a small fish. At other times, they sit on branches overhanging water and dive when a fish appears below.

Reflected glare from water can make fishing tough, but kingfishers' eyes have built-in "sunglasses." Special oil droplets in their eyes act as filters so the birds can see through the glare. The kingfisher's eyes are forward on its head, increasing the area of overlapping, or binocular, vision.

know the real way that kingfishers nest. One day in April, both male and female use their powerful bills to hammer out a long burrow in the clay or gravel bank of a river or stream. Sometimes flying full tilt into the streambank to dislodge the dirt, other times chiseling away the dirt from a stationary perch, the pair excavate a tunnel from 3 to 10 feet long. At the end of the tunnel they hollow out a small cavity.

At this point the female takes over and lays her eggs inside the cavity. There's no nest, you see. No assemblage of twigs and grass. Just a soft hollow for the five or eight small white eggs. For 23 days or so the pair takes turns incubating the eggs, squirming out of the tunnel and squirming back in again to sit on the eggs.

Finally the eggs hatch and, with five to eight naked little hungry things, the kingfishers turn to the next order of business — feeding them. Happily the kingfishers are masters of this duty. And May is a good time to catch them at it. Oftentimes they fish by perching on an overhanging branch. Waiting for a shallow-water minnow to appear, they drop like a shot to seize it, folding their wings slightly to achieve speed. The fisher kings can also hover above the water like terns, before diving. Kingfishers have been known to eat frogs, salamanders and grasshoppers as well as fish. When fishing for themselves, they swallow the fish head first and then regurgitate the bones, scoured clean by digestive juices, in the form of pellets.

Diving head first into a shallow stream doesn't seem to come naturally to the little kingfishers. They must be trained to the task. Some observers have seen mother kingfishers throw a crippled fish into the water below her hungry brood. Sooner or later one of the more daring will do a belly flop into the water and grab the fish. Hunger usually drives the others to do the same, and in 10 days or so they are diving and catching their own food.

As you paddle up some quiet river this summer, enjoying your halcyon days, you may see the kingfisher. It may rattle at you like a noise-maker, but it's only telling you who's who. You may be a two-footed mammal, adept with a paddle, but the kingfisher is royalty.

"An eagle, golden feathers flashing, launched itself from the enclosure followed by another. They flapped their massive wings to gather the air that would lift their 10-pound bodies in flight for the first time."

Goldens In The Hills

Golden eagles may again soar over the Southern Appalachians if this restoration project succeeds.

written and photographed by Curtis Wooten

August 21, 1982: In the pale light of early morning three men, a white canvas tarp in hand, worked their way cautiously toward a large cage perched atop a rock outcropping on the lee side of Tennett Mountain in the heart of the Pisgah National Forest. They unfurled the tarp and carefully covered the cage. Two hundred yards below, television camera crews and newspaper photographers began to climb into positions just below the covered cage and concealed themselves.

After the sun rose above the Black Mountains to the east, casting long shadows over the valley of the Pigeon River and burning away the mist that shrouded the ancient peaks, the men returned to the cage and removed the tarp. Hammers appeared and nails holding the front panel of the cage in place were pried loose. As the panel was carried away from the front of the cage, an eagle, golden feathers flashing, launched itself from the enclosure, immediately followed by a second, slightly larger, eagle. Dropping, they flapped their massive wings — nearly 7 feet from tip to tip — two, three times, trying to gather the air that would lift their 10-pound bodies in flight for the first time. On the third wing beat they caught an updraft that lifted them 75 feet above the whirring and clicking cameras. Two hundred yards out they set their wings, the ground dropping rapidly beneath them, and glided over the valley, testing the new experience — flight.

Clustered in a gap in the ridge a quarter mile away a group of volunteers who had "sat" the eagles over the previous 14 weeks watched through binoculars as the birds rose in flight for the first time. A charge of bubbling excitement coursed through the group as the eagles glided across the valley. Beaming smiles could be seen from the ridgetop above.

Back at the cage a third eagle, a female, was apparently unenthused about her newly bestowed freedom and the prospect of first flight. For nearly an hour she sat at the edge of the opened cage, peering intently at the countryside below and occasionally hopping to the boulders and log outside the cage. Flight finally came reluctantly as she slipped on the slick surface of a boulder and fell into the air. A couple of wingbeats put her out over the valley and into an updraft like her two brothers. There, she set her wings and soared for a full five minutes, banking over the gorge and finally gliding to a rest on a dead snag some two miles below us.

Another release of golden eagles in the North Carolina mountains had come off successfully. The cameramen and photographers worked their way slowly back down the ridge to the base camp where they interviewed biologists and volunteers and rushed off to write and air their story. Two days later three more eagles, perched in a cage across the gap from the first site, were released.

Golden eagles are native to the North Carolina mountains, having nested on craggy peaks here possibly until as recently as 40 years ago. Only wintering birds, Canadian residents, have been seen in recent years, however, but this release, a similar one made a year earlier and others planned, are aimed at changing that.

The North Carolina Golden Eagle Restoration Project actually began four years ago, in 1979, when David Cone, the program coordinator for Gastonia's Schiele Museum of Natural History, contacted biologists with the U.S. Fish and Wildlife Service and the U.S. Forest Service about the possibility of releasing golden eagles in the Pisgah National Forest. Dave, an enthusiastic birder and hiker, had had an intense interest in raptors since his college days. "I thought it would be really nice when on outings in the mountains to see eagles soaring over these peaks again," he said. "At the time I thought it might be as simple as going out West where the birds are more plentiful, capturing a couple, transporting them here and releasing them." It turned out to be not so simple.

After his initial inquiries, Dave received a letter from Ben Sanders, the wildlife biologist for the National Forests in North Carolina at the time. "Ben didn't encourage me about the project, but he didn't discourage me either. He did provide a rather lengthy list of questions that we needed to answer before seriously pursuing involvement in such a project. It was in looking over that list that I realized just how naive we were about the process and problems of raptor restoration. The legalities alone were awesome."

Sanders and Gary Henry, an endangered-species biologist with the U.S. Fish and Wildlife Service based in Asheville, referred Cone to Dr. Donald Hammer, the senior wetlands ecologist for the Tennessee Valley Authority (TVA) who works out of Norris, Tennessee. Hammer was contacted because of his expertise in the "hacking" of bald eagles and osprey in the Tennessee Valley and Sanders thought he might be interested in working with golden eagles in western North Carolina. He was.

After consulting with Hammer and learning of eagle "hacking," Cone and members of the museum's Expedition Society, with assistance from Forest Service personnel, identified what they thought was a suitable area for an artificial eagle aerie. It was located near the Shining Rock Wilderness in an area where habitat

had been improved for golden eagles. A few weeks later Hammer and biologists scouted the area and narrowed the selection of potential aerie sites. After a coordination meeting among the agencies that would be involved — the U.S. Fish and Wildlife Service, the U.S. Forest Service, TVA, the North Carolina Wildlife Resources Commission, the Schiele Museum, and the Blue Ridge Parkway — a decision was made to launch the project in the summer of 1981 by "hacking" two young eagles.

"Hacking" is an old falconer's term passed down from the Middle Ages, meaning, in a nutshell, "to allow a young raptor to learn to fly and take prey by itself without any parental help, from a spot where it has regularly fed." Used successfully with bald eagles, peregrine falcons and osprey, hacking allows the birds to develop visual identification with the area as they grow.

"That's the primary difference between simply releasing eagles and rearing them on site, then releasing them," says Hammer. "If you release adult birds, they'll just fly back to where they came from, but if they grow up in an area, they develop visual identification with it and are more likely to consider it home." The homing instinct of the birds reared in the Pisgah should be strong enough to bring them back to the area to nest when they reach sexual maturity in four or five years.

In hacking projects like this one, it is important that people avoid contact with the young birds. Once placed in the cage atop the mountain, the birds do not see a human at close range again until two days before release. "The essential element is that the birds must never associate food with man," says Hammer. "If they do, they become tame and can never survive in the wild. Some backpacker might have a golden eagle looking for handout trying to land on his shoulder."

In 1981 Hammer arranged to obtain two young golden eagles from the Eagle Propagation Center located just outside St. Louis, Mo. The Propagation Center, a privately funded and operated organization, takes in injured raptors, particularly eagles, rehabilitates them when possible and returns them to the wild. Those that have injuries that prevent their survival in the wild are kept as part of the center's captive-breeding program. The eggs they lay are hatched and the young eaglets made available to professionals such as Hammer for re-establishment of wild populations.

In mid-June Hammer flew to St. Louis in his private plane, picked up the two

3

seven-week old, 7-pound eaglets and flew them to the Asheville airport. From there they were transported by van to the base of the mountain and portaged over the ridge to their home for the next two months.

They remained caged until mid-August, two weeks beyond the normal fledging period for eagles. "This extra time gave them that much more strength in their wings," said Hammer. "Ordinarily, they leave the nest trying to fly and end up on the ground with mama and papa continuing to feed and protect them. Mama and papa aren't around in this situation so we keep them in the nest a while longer."

Two days before the eagles were to try it on their own, Hammer attached bands to their legs, color markers to their wings and sewed a homing device to the tail feathers of each bird, to allow for future identification and tracking.

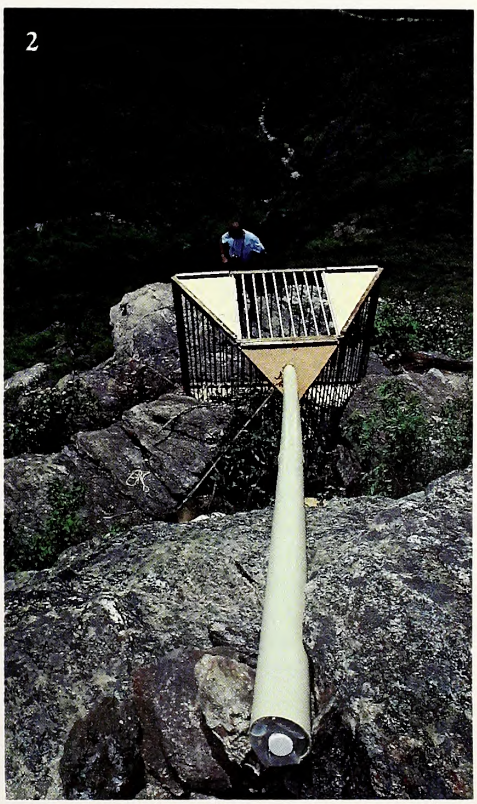
Making the transition from nestling to a self-sustaining hunter is not an easy accomplishment for golden eagles. Nearly half of those leaving natural nests fail to survive the first few weeks, even with the parents caring for them. "Hacked" eagles have no parents on hand to look after them so project workers fill in the role. After the birds' release, Hammer, Dan Roberts, a UNC-Charlotte graduate student doing research on eagle behavior, and Greg Reid, a TVA biologist who works with Hammer, track their movements with electronic gear and go to their aid when they get into trouble.

"It's like babysitting a teenager," says Hammer. "They're old enough and big enough to get themselves into trouble without always being able to get themselves out." On several occasions the two birds released in 1981 got tangled in thickets and brush and totally exhausted themselves attempting to escape. They were retrieved, fed and allowed to rest overnight, then released.

With the experience and success of the 1981 project behind them a decision was made to expand the program in 1982 — to establish two hack sites with six birds. The hack sites, themselves, were moved. "In '81, we placed the cage on the

"Hacking means to allow a young raptor to learn to fly and take prey without parental help."

Adult golden eagle, held by Bill Voelcker, director of the Eagle Propagation Center in Illinois, was placed in cage with young eaglet, held by Dr. Dave Hammer of TVA (1). Adult eagle acted as a foster parent to the young bird, feeding it in the early stages of its stay. Eaglets should not associate food with humans, so meat from road-killed animals was dropped to cage through a plastic tube (2), or placed in cage from behind by volunteers like Mary Metcalfe and family (3). Birds were banded and homing devices attached to tail feathers (4) two days before cages were opened. From immaturity (5) to freedom (6) — a matter of months and devotion from many people.



Want To Bird-Sit An Eagle?

A unique aspect of the eagle-restoration project is its use of volunteers, or people with no professional training in wildlife restoration. They provide the bulk of the manpower to look after the young eagles during their two-month development on the mountain. They volunteer from two days up to a week or more to "sit" the birds, making sure that they are fed regularly, and that they are not harassed. Without them the project would not be possible. There aren't funds in either state or federal coffers to hire someone to do the work the volunteers do.

Dave Cone and Larry Dixon, a project volunteer, select and coordinate the schedules of the volunteers. Of them Dave says "We feel that it is important to have people, lay people, involved in this kind of project. The volunteers who have come up here get a good idea, first hand, of what wildlife restoration and research involves — the importance of it; and I think that their involvement adds a new dimension to each of their lives. It is a rare opportunity to see eagles and be involved with their care and realize that you're having something to do with bringing them back to the area."

Teachers, housewives, attorneys, doctors and mill workers, many family groups — even a couple of newlyweds on their honeymoon — have been involved. To date, nearly 80 people have spent time on the mountain "sitting" the eagles. That figure will climb into the hundreds before the project is completed.

Mary Metcalfe, a teacher who works in a special program for status offenders in the Gaston County schools, spent a week with her teenage daughter and son sitting the eagles last August. "I have a lot of selfish reasons for involvement in the project," she said. "One is that I was raised in this area and I plan to retire back here and I can't imagine anything more wonderful than seeing a golden eagle soar over these peaks and be able to say, 'Hey! I had a part in bringing those back.' It's a thing that needs to be done and I want my children to be in on it."

Eagle "sitters" have been recruited from the ranks of sportsmen's organizations such as Ducks Unlimited and the North Carolina Wildlife Federation; from Charlotte and Asheville area bird clubs; from the regional membership of the Audubon Society and Sierra Club; from Charlotte's inner-city youth programs; from scout troops and from teachers and students in western North Carolina. Anyone who has a sincere interest in the project and who has a few days to a week or more to volunteer is eligible for consideration. Inquiries should be sent to David Cone, the Schiele Museum of Natural History, P.O. Box 953, Gastonia, N.C. 28052.

back of a fairly high, obscure mountain because we weren't sure of public reaction," said Cone. "We worked with the media to let the public know that the project was underway but we didn't want them to know exactly where the birds were located. Of course, the secrecy didn't work. The local people knew where the birds were probably before they were placed in their cage.

"As it turned out our fears were unfounded. Hikers, campers, berry pickers, hunters — all were enthusiastic about the project and extremely supportive of our efforts. One deer hunter who moved his camper into the area in August as a scouting base even offered its use."

As a result of that support the hack sites were relocated in '82 to areas overlooking high grassy balds where hunting would be easier for the eagles and prey — groundhogs and rabbits — more plentiful.

Four of the six birds hacked in '82 were actually released. The three that soared into the mist on August 21st were all healthy, but two days later when Hammer went in to band and attach transmitters to the three birds at the other hack site, he found two of them in poor health. The left wing of one of the birds drooped, indicating a pulled muscle or other injury which would prevent it from flying well enough to fend for itself. It was transported back to the Eagle Propagation Center for rehabilitation. A second eagle was found to be emaciated and wheezing, indicating a severe lung congestion. It was transported to the veterinary hospital at the University of Tennessee in Knoxville where it was treated but later died. The third eagle in the cage, in excellent health, was banded and released.

Signals from the four birds were picked up in the area for three weeks after their release. Then there was nothing. One of the four was found a month later under a power line in North Georgia, electrocuted. It was about 150 miles from the release site. Another was picked up, exhausted, in central Kentucky a week later. It was nursed back to health, returned to the Pisgah and re-released. It hasn't been heard from since.

Two years into the eagle-restoration project there are now five eagles roaming North America with a homing instinct for the mountains of western North Carolina, but the story is just beginning.

Next month, if things go as planned, nine young eagles will be brought in and placed in three hack cages in two locations, starting the process all over again. The procedure will be repeated each year for the next five or six years. Cone says that when the project was begun it was expected to be six to eight years before the results were understood. "With their high mortality rate it takes a while to build up any kind of population ," he said. "It will be another year or two at a minimum before we have any indication whether the birds already released will return to nest, and if we hack birds for another six years, we're looking at nine or 10 years that we'll be actively monitoring these birds."

The future of golden eagles in western North Carolina is by no means assured but it looks bright. And the golden eagle restoration project has been a success. It has successfully brought together the resources of three levels of government — four federal agencies, a state agency and a city museum — for a common purpose: the restoration of a magnificent bird to its former territory. And before the project is completed hundreds of people will have contributed to that effort.

There's nothing more hopeful about this project than this cooperation between the many "publics" with an interest in wildlife. It's the key to restoring that which we have lost and conserving that which we now enjoy. It's the key to a brighter future for our wildlife.

LIFE ON THE TOURNAMENT TRAIL

It's not all fun and games for the "Fish for Funds" bass pros.

by Mark Taylor

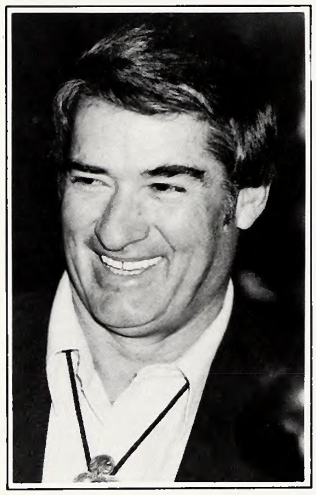
It's a life that most of us have dreamed of since we were kids. What could be better than being paid to fish. Not so long ago, this elusive dream was the exclusive domain of a small circle of outdoor writers whose prose enlivened the sports pages of a few of the larger daily newspapers and a handful of outdoor magazines. Fine fishermen, many of these reporters, but in the long run, their ability to make a living depended more upon proficiency at the typewriter than skill in wielding a casting rod.

The rise in popularity of bass fishing in the 1960s changed the situation. Starting in the Deep South, bass-fishing fever swept most of the nation. Glittering bass boats replaced battered, aluminum semi-vees, and sophisticated electronics filled the tackle shops and marinas. Bass tournaments sprung up, and a new breed of fishermen emerged. These were the bass pros — men who could catch more fish than anyone else. Soon, a pro bass tour developed — with real money at stake. In 1982, the total prize money for the Bass Master's Classic — the World Series of bass fishing — was $100,000, and first place was worth $40,000. Not all of this occurred without controversy, yet right or wrong the "Fish for Funds" concept endured. Now, there's talk that the total prize money for the Classic will be a cool quarter-million in a few years, and you may watch the winning fish landed on *Wide World of Sports.*

What's life like for the handful of fishermen who make a living on the pro bass tour? Is it an idyllic life of fishing classic waters like Currituck Sound or the St. Lawrence Seaway? Is it enjoying warm camaraderie with other anglers at day's end over a fine dinner and a glass of good whiskey, or big money from winning top purses? Perhaps it's the thrill of memorable catches — of big fish brought to net, and cherished for years to come?

Well, not exactly. Indeed, it appears pro bass fishermen care little about those things.

Last February, some of the top bass pros in the nation were in Greensboro serving as instructors at the Bass Fishing Institute. Bass fishermen from as far away as Maine were there a thousand strong — and they got their money's worth. *Wildlife In North Carolina* was there, too. We could tell you how the pros fish structure, muddy water, and so on, but you've probably heard it before. The pros don't have any magical secrets for catching bass, as they will be the first to admit. Success is usually spelled H-A-R-D W-O-R-K. What fascinated us, however, was the life of a professional fisherman. We thought you'd be interested, too. So, here are comments from some of the best about life on the tournament trail.



Tom Mann is one of the few bass pros who has managed to parlay his fishing success into a modest financial empire. The Alabama native markets a successful line of fishing tackle, and is heavily involved in trying to develop a genetically superior strain of largemouth bass.

Tom Mann

As soon as Tom Mann walks through the door, I think of Ted Williams. Like the former Red Sox great, Mann is a big, soft-spoken man — look at his thick wrists and large hands, and it's easy to believe that he could toss a plug for hours on end without tiring. His dark, lined face and preference for elaborate silver-and-turquoise Navajo jewelry bespeak his Indian ancestry. Mann is half Cherokee, and although he is a native of Alabama, his Indian ancestors were from western North Carolina.

He is also one of the elder statesmen on the pro bass circuit. Mann fished in the first organized bass tournament ever held — on Smith Lake in Alabama — and finished second. Since 1967, he has fished in over 100 national tournaments, and has also been elected to the National Fishing Hall of Fame.

"For the past three years, I've been retired from tournament fishing and have devoted myself to my business interests," he said. "I still fish a few tournaments each year for fun, but I seldom win — the prizes usually go to the younger fishermen who are hungrier than I am. When I was fishing tournaments seriously, I spent all of my spare time studying lake maps, weather forecasts, and talking to other fishermen. After 10 years of this type of fishing, I was ready to call it quits."

Mann is one of the few bass fishermen who has managed to parlay his success into a modest empire. In most tackle boxes, you'll find a handful of Jelly Worms — Mann invented them. The Jelly Worm forms the base of a successful line of tackle that Mann manufactures and retails. He is also heavily involved in bass research and management on extensive hatchery and lake facilities which he owns near his home in Eufaula, Alabama.

"Product development and endorsements are really the only ways to make any money from pro bass fishing," said Mann. "It's very difficult to make a decent living from prizes alone."

photography by Ken Taylor

Bass Fishing Institutes feature instructors who are among the top fishing pros in the nation. One fisherman claimed he could learn more about fishing in two days at an Institute workshop than in a whole summer on the water.

This refrain is echoed by the other tournament pros. Very few fishermen are supported solely by prize money. Most market their own line of fishing tackle, serve as representatives or consultants to tackle companies, or are involved in other businesses unconnected with fishing.

In addition to following his business interests, Mann is concerned about the future of fishing. For the past three years, he has been heavily involved with youth-fishing programs.

"I've always enjoyed working with kids. In the past, I've conducted fishing programs for troubled youths in state facilities in Alabama. I've also set up a series of Tom Mann junior-fishing clubs for youths. These clubs not only promote fishing, but also stress good conservation. I was a conservation officer in Alabama from 1960 until 1965, and I feel that it's important that kids know not only the how's but the why's of fishing and other natural resource issues.

"I also hope to set up a series of big bass tournaments for teenagers in the near future — kids need to be able to identify with heroes their

own age. Most of all, though, I want to see lots of kids fishing. I'd hate to see us lose a whole generation to video games."

Roger Moore

If consistency is the mark of a champion, then Roger Moore of Branson, Missouri, is one of the best. Before retiring to the tackle business, he once caught fish on 108 consecutive days of tournament fishing — a record on the bass circuit, where even the best suffer their share of skunkings.

"This may sound strange, but I believe that luck plays a big role in tournament fishing," he said. "Luck will beat skill many times. I've always been pretty lucky — I guess I'm just consistently lucky."

Even with his impressive record of boating fish, Moore is no stranger to bad luck. Asked about his most disastrous fishing experience, he immediately flashed a giant grin.

"It was my rookie year on the pro fishing circuit. I had finished 25th in my first tournament, which wasn't too bad, and was pretty cocky when the second one rolled around. I figured there'd be nothing to it.

"I started by being penalized 10 percent of my total points because my boat was throwing a rooster-tail. That same day, me and my partner had a mild disagreement — he was gonna beat me up right in the boat. The psychology of handling your partner gets kind of involved. The next day, I had a new partner. He stole three of my fish. I had been marking my fish by clipping a fin and when the fishing got hot, I forgot to mark a few. My partner claimed the unmarked fish at the weigh-in. I was real mad, but he told me that was the price I paid for being a rookie. Later, we became good friends — and I never forgot to mark a fish again.

"The finale occurred at the weigh-in on the last day of the tournament. I was coming into the dock when the drain plug in my boat popped out. I sank right at the landing in front of a huge crowd of people. It was a humbling experience."

Bill Murray

"Most people probably get me mixed up with my brother, Bobby. He's better known as a fisherman than I am, and is also my identical twin. Folks get us confused a lot."

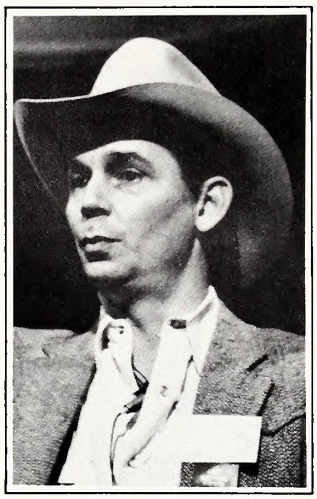
Fishing has been a family affair for the Murrays since the boys started fishing small lakes near their Arkansas home. Both became fishermen of national repute, and Billy — who now makes his home in Willis, Texas — was elected to the National Sport Fishing Hall of Fame after winning a long string of tournaments.

What does an angler of Murray's reputation find most challenging about tournament fishing? Locating fish in strange waters? Getting the edge on the other pros?

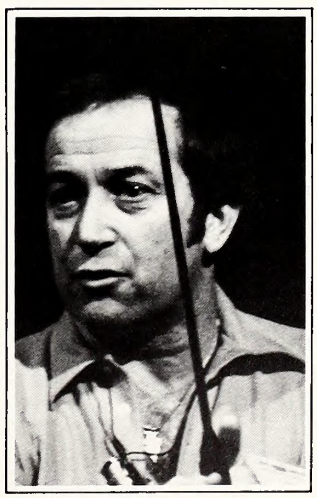
"The hardest part of tournament fishing is keeping your equipment working. I spend a lot of my spare time at tournaments going over my tackle and working on my boat. That's not much fun after you've fished all day, but you have to do it. A lot of fishermen are beat by their own equipment. You can't catch fish if your boat isn't running or your reels are broken."

Like the other pros, Murray draws a blank when you ask him about his most memorable bass. There have been so many fish, so many tournaments. But, this isn't the case when you question him about his favorite fishing trips.

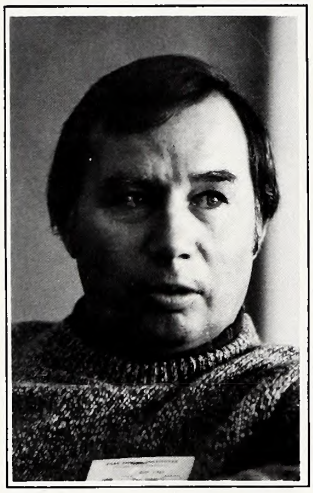
"Two experiences stand out. I really enjoy taking my family on wilderness canoeing and fishing trips in the Quetico and Boundary Waters areas of northern Minnesota and Ontario. The country is beautiful and the fishing is great — thousands of people canoe these waters, but few stop to fish. But, my first trip to the Arctic was absolutely tops. We fished for lake trout, char and grayling. It wasn't so much the fishing as the country. It's so wild — you feel like you're the first man to ever see it!"



Billy Murray — and his twin brother Bobby — are two of the best pro fishermen on the tournament trail. Like most other bass pros, Billy Murray markets a line of fishing tackle, and says it's very difficult to make a living from tournament fishing alone.



Roger Moore is one of the most consistent bass fishermen on the pro circuit. He ascribes his success largely to luck, but says concentration is also vital. When fishing, he never sits down because he says it makes him lazy.



Paul Chamblee of Raleigh found tournament bass fishing both intriguing and very expensive. He says that a good way to break into tournament fishing is to fish small local tournaments, and adds that even in these events, you'll be up against some very good competition.

Fishing is a family sport and the bass pros enjoy working with young people as well as experienced fishermen. Many of the tournament pros point out that youngsters are often the most knowledgeable fishermen on a lake. There are no secrets to successful bass fishing. This was a constant refrain throughout the lectures and demonstrations at the Bass Fishing Institute. Many anglers ignore the basics of good fishing, and don't apply what they already know about good techniques.

Paul Chamblee

"I guess you could describe my tournament fishing as a hobby that got out of hand. It's addictive."

Paul Chamblee of Raleigh is probably typical of some of the better anglers who fish major bass tournaments. He does not fish for a living — his bread-and-butter comes from the family insurance business — but competitive bass fishing has been a major obsession in his life. For six straight years, he qualified to fish in the Bass Master's Classic.

"I started fishing competitively long before I ever entered a tournament," he said. "I used to fish a lot at Santee-Cooper in South Carolina, and knew all of the local fishing guides, excellent fishermen like Roland Martin and a few others. We always fished competitively in a friendly way. When they entered a few tournaments and won, I figured I could too."

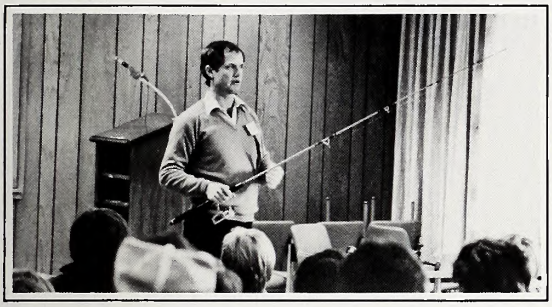
Chamblee was soon fishing in several major tournaments each year, and regularly qualified for the Classic. He loved the sport, but found it involved some trade offs. He spent a lot of time away from his family and business, and his bank account took a beating.

"Tournament fishing is a very expensive sport. Eventually, I felt I had to give it up. For starters, the equipment is extremely expensive — a good boat costs at least $10,000. Then, there's electronics, tackle, and so forth. The cost of attending a tournament is also considerable — the entry fee alone may be $300. When you include travel and lodging for a week to 10 days, the cost averages from $1,000 to $1,500 per tournament."

Still, Chamblee says that the average angler can tournament fish if he wants to badly enough. He offers some good advice — fish small, local tournaments to hone skills and minimize expenses, and consider fishing a major tournament as a vacation.

"You can learn a lot and have a good time fishing at a tournament, but don't expect to make any money at it. Consider it a vacation, of sorts. You'll get to fish plenty — from early morning until dusk for six long days. During the evenings, most fishermen go over their maps and notes or work on their tackle before turning in about 9:30. There's not much night life.

"You'll also fish in conditions that no sane person would tolerate because bass tournaments are never called off. Expect to fish all day in 40 mile per hour winds, freezing rain, or snow flurries. What you rarely see are sunny days. For some reason, the weather is always foul during bass tournaments. Like I said, consider it a vacation."



Rich Clunn

"You asked me for some funny stories about fishing in bass tournaments. Well, there's nothing funny about tournament fishing. That's like asking Muhammed Ali what the funniest thing was that ever happened to him in the ring."

Rick Clunn is not a humorless man. Indeed, he is very pleasant — but he's deadly serious about fishing. He has the intensity you would expect from a major-league baseball pitcher, or perhaps a long-distance runner. As well he should. He is one of fishing's superstars, the only man other than Bobby Murray to win the Bass Master's Classic twice — back-to-back in 1976 and 1977. Currently, he fishes an average of 15 to 20 national tournaments per year, and his work pattern runs like this:

"I start preparing for a tournament several weeks before it begins. First, I get hold of a good set of maps of the lake. I study these extensively — noting the locations of weed beds, channels, creeks and other areas that may hold fish. I want to know the lake pretty well before I get there. I also read anything I can find about the lake, and check the long-range weather forecasts for the area. Finally, I check my notes — looking at similar bodies of water at the same season with similar weather conditions to try to determine patterns and strategies."

His notes. With all of the modern, sophisticated electronics available to fishermen today — which Clunn uses to full advantage — a well-kept journal is his most important tool.

"I would urge every fisherman to keep a journal. Note the weather conditions, temperatures, habitat where you found fish, water conditions, and so on. As time passes, your journal will become more sophisticated. In a few years, you'll have an excellent resource of information. Bass are predictable creatures, and patterns of behavior do emerge."

After Clunn finishes his homework, he travels to the tournament site — arriving a few days early if possible. "When I get to the lake, I go over all of my maps and notes again. Then, I rent an airplane and fly the lake — it's the best way to learn a body of water quickly and determine local conditions. For example, there may be a big bank of muddy water that's not worth fishing, but a small clear patch may exist behind the mud in a creek arm. You can see this sort of thing best from the air. Of course, I record all this information on my maps and notes."

During the three practice fishing days before the competition begins, Clunn usually fishes alone, checking his theories and looking for patterns. At night, he holes up in his motel room and continues poring over his maps and notes. He follows the same routine once the competition gets underway.

"Basically, I'm an isolationist. I don't socialize much at tournaments, but spend most of my time alone studying the lake. I'm not interested in the fishing talk around the docks or in the tackle shops. I like to go out on the water without any preconceived notions."

Clunn works hard at his fishing and says that concentration and versatility are keys to success.

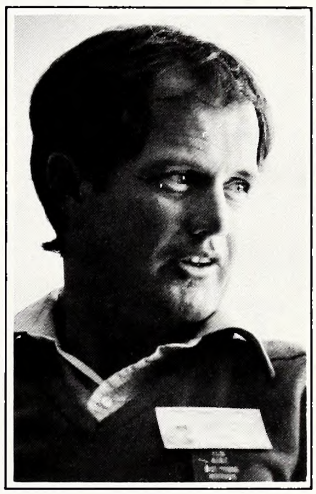
"I leave my personal fishing preferences at the dock. There's nothing finer than watching a bass hit a topwater bait, but often this is not the most productive way to fish. I use whatever method works best.

"There's also no substitute for hard work and concentration. Many anglers feel that sophisticated electronics will make them better fishermen. This is not the case. A chart recorder may show where the fish are, but it won't make them bite. And some of the new technology — pH meters, for example — far outstrip the average fisherman's ability to use them. Electronics are useful tools, but can't replace fishing savvy. I still find that using my notes from past experiences to determine seasonal patterns works best."

Not surprisingly, Clunn says that his favorite fishing is on tough, hard-to-fish waters. "I like lakes where the fish aren't biting — lakes with bad reputations — because that's where I work hardest and do best. There is one exception to this. For sheer pleasure, I like to fish the big, western desert reservoirs like Powell and Mead. The fish are easy to catch, but the country is so desolate and empty — and beautiful in a stark way.

The life that Clunn leads is not easy. He says that pro fishing has more than its share of financial ups and downs. There are also long drives between tournaments, exhausting days of fishing in foul weather, and long stretches away from his home and family in Montgomery, Texas. Still, he wouldn't change it.

"For seven years, I worked in computors on the 12th floor of the Exxon Building in downtown Houston. I hated it — I lived for Saturdays and fishing. It's been 10 years since I've had what my little girl calls a 'real job.' Every day is a Saturday for me now."



Rick Clunn is one of the superstars of pro bass fishing, and takes full advantage of the modern electronics that are now available. Yet, he adds, many fishermen use these gadgets as a crutch. While he finds them useful, his most important tool is a simple fisherman's journal recording past fishing trips. He studies it faithfully before each tournament.

THREE WAYS FOR COBIA

Cobia are strong fighters, grow to large sizes and are excellent eating. Here's how to catch them.

written and photographed by Joel Arrington

There are at least three ways to catch cobia in coastal North Carolina and over wrecks scattered across the Continental Shelf. One way — soaking bait on the bottom in deep holes behind the inlets — has been less successful these last six or seven years for unknown reasons, but the other two ways continue to produce probably as many fish as they always have.

Cobia occur worldwide in temperate and tropical seas. In the western Atlantic, they occur from Bermuda and Massachusetts to Argentina, and many of them winter in the southern Gulf of Mexico and Atlantic Ocean near the Florida Keys. In spring, they migrate up both coasts of Florida, producing predictable fishing in April along the beaches as far north as Jacksonville on the Atlantic, and Destin on the Gulf.

There is little known for sure about cobia movements in the Atlantic north of Florida. It would appear, however, that the fish, which may travel in small schools in southern waters, tend to disperse the farther north they go, dropping off for varying periods at wrecks and over certain rough pieces of bottom along the Continental Shelf. Some of these fish, at least, eventually enter North Carolina inlets to spawn in the deeper channels which run to the sounds. This northerly migration continues in large numbers to Chesapeake Bay, where fishing has also fallen off in recent years, and to a more limited degree to Cape Cod.

Concurrent with the spring migration along the Atlantic Coast of Florida is a movement of rays, including giant manta rays, with which cobia are associated at this time of year. Charley Waterman and others have written about casting to these rays for cobia which run with them and have speculated on the consequences of one of the big rays leaping from the water, as they frequently do for unknown reasons, and landing on an angler's skiff. Some manta rays weigh over 1,000 pounds, but fortunately, there is no record that one has either deliberately or accidentally landed on a boat, although reportedly there have been some near misses.

In North Carolina, we do not have a similar predictable run of either rays or cobia. The latter begin to show up around inlet buoys and in deep holes nearby in late April, but cobia appearances do not really begin here until May. There could be fish around inlets south of Cape Lookout as late as early July, and as late as August at Oregon Inlet. Apparently the movement is up the coast and out along the Shelf, then inshore to spawn and out again to the Shelf before beginning a southerly migration in the fall. These southerly movements are more scattered and ill-defined, even in Florida, but I have heard of a large school — several hundred fish — at Cape Lookout in late summer.

Since cobia are not a commercial fish of great importance — a

Cobia reach large sizes and because they are very strong, it takes fairly heavy tackle to keep them from cutting the line on the buoys and wrecks that attract them. These fish are fairly common in these locations, but are not as numerous as they were a few years ago in deep holes inside the inlets.

few turn up occasionally in the market — they have been studied hardly at all. Sport fishing for them is the only, albeit inefficient, method we have of learning anything about them; so, much of what we think we know is based on a series of rumors and unsubstantiated reports.

Several gamefish species — bluefish, gray trout and stripers come to mind — have declined for unknown reasons in recent times, then rebounded. These fluctuations in populations have sometimes been both across the species' range, as was the case with bluefish, and localized, as seems to be the case with cobia. There have been strong runs of cobia along both coasts of Florida

in recent years, including the spring of 1982, and the number of fish over wrecks and around buoys along our coast appears to be holding up. It is only in the deep channels between North Carolina inlets and sounds that cobia have declined, and in Chesapeake Bay. It would seem that there is no overall decline in the total number of cobia coming up the Atlantic Coast, but merely fewer entering bays in the northern segment of their Atlantic summering grounds.

Still, because of concern about the declining fishing for cobia in some areas, federal authorities have established a minimum size limit of 33 inches on cobia within the federally controlled offshore waters extending from three miles offshore to the internationally recognized 200-mile limit. North Carolina is expected to adopt this 33-inch minimum size limit for inshore waters as well, and this may be in effect by the time you read this.

On hot summer days, we used to anchor beside the "cobia stake" in Pamlico Sound back of Hatteras Village and bait four rods with fresh menhaden, mullet or herring. At times the crabs were so bad it was steady work just to keep at least one good bait down. Then a big ray would ease off with your line and you could be a half hour in sometimes equatorial heat trying to get your leader in hand to cut it. Lots of these cousins of the sharks would go over 4 feet across and weigh nearly 100 pounds.

Some years the cobia would hit on the flood tide, while in others it would be high slack or the ebb. We never did figure it out, but we could usually count on two or three fish a tide until about 1977 when success began to decline. You can still catch fish this way, but not nearly with the regularity of former years.

The places to try are well known in such former cobia hot spots as Morehead City (Bogue Sound behind the Fisheries office and in the mouth of the Newport River near the Beaufort bridge), Ocracoke (Blair Channel and Teach's Hole), and Hatteras (the "Cobia stake" and Sloop Channel). All the marinas have people who can advise you where to go and where to get fresh bait, which is important. We tried chumming several years, but it wasn't any more effective than not chumming, and it attracted a host of nuisance crabs, sharks and rays, and was a mess and bother besides.

A cobia is a dim-witted beast. One will root into a wire crab pot and eventually destroy it, which must do extensive damage to its eyes and skin. As a species, they are slow to get excited about a bait or lure and, in fact, may refuse even a live bait that is too frisky for it. You can hook a fresh 8-inch bluefish through the back for king mackerel and if a cobia comes around, it might make a run or two at the bait before it gives up. You can trim the tail of that blue to slow it down and a cobia will eat it; or you can use a small trout, a pinfish, eel or other slow-swimming bait and usually a cobia will eat it right away — if it sees it. You can fish baits on the bottom from an anchored boat and not have a bite for hours, then look over the transom and see a cobia hanging in the current behind your outboard. You won't know how long it will have been there.

Dim-witted, perhaps, but highly instinctual. They are a strong fish and fight with great stamina, although cobia are not the fastest swimmers. At times, hooked fish will come docilely to the boat, especially if you play them gently, but they have a habit of coming alive on the gaff and making trouble. Capt. Thurston Gaskill, who has guided at Ocracoke for over 50 years, used to tickle cobia with a gaff when his customers had them boatside so they would run off and exhaust themselves even further. I guess he lost a few this way, but once hooked, cobia usually stay hooked, so he no doubt saved himself a lot of grief, too.

We could hear the two anglers talking in the little johnboat

Big Game Tag Report Number 7

. . . a summary of North Carolina's big game harvest for 1982-83 as reported by hunters to Wildlife Cooperator Agents

Why should a hunter go out of his way to tag and report the turkey gobbler he just shot? How many deer were harvested during the 1982-83 season here in North Carolina? Was the total deer harvest for this period greater or less than this figure for last season? How is this information used? These are questions that often surface during discussions of North Carolina's big game tagging system. The big game tagging system is a reporting procedure which requires that all wild turkey, boar, bear and deer which are harvested by hunters here in the State be tagged at the site of harvest and that certain information be reported to any one of approximately 1,500 Wildlife Cooperator Agents for later collection by the Wildlife Resources Commission. This procedure became mandatory in the fall of 1976. Successful game management is based on many factors and individual pieces of information, including in this case, big game harvest figures. The more a game manager knows about population trends and numbers, the easier it is for him to make decisions affecting seasons, bag limits and other regulatory matters. Sound big game management must be the result of the combined efforts of sportsmen and the staff of the Wildlife Commission. While the figures in this report represent the reported harvest and may vary from the actual harvest, they are the best such figures available at this time. Please do your share to see that future reports of this nature are as complete as possible by tagging and reporting your big game harvests and by encouraging your fellow sportsmen to do the same.

If you have questions about the procedures or this report, please contact the Division of Wildlife Management, North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Archdale Building, Raleigh, North Carolina 27611.

1982-83 Reported Black Bear Harvest

County	Male	Female	Not Listed	Total	Game Land	Other Land	Not Listed	Rifle	Shotgun	Not Listed
Bladen	6	9		15	3	12		10	5	
Brunswick	2	1	2	5		5		3	2	
Buncombe	1	1		2			2	2		
Burke		2		2	2			1	1	
Caldwell	4	2		6	4	2		5	1	
Carteret	9	4		13	6	7		13		
Cherokee	3	1		4	4			1	3	
Clay	10	7	2	19	14	3	2	19		
Columbus	1	1		2		2		1	1	
Cumberland	2			2		2		2		
Duplin	2	3		5		4	1	4		1
Graham	25	10	2	37	37			36	1	
Haywood	11	17		28	15	13		28		
Henderson	1			1		1		1		
Jackson	4	2	1	7	5	2		6	1	
McDowell	17	8	6	31	22	9		26	4	1
Macon	9	11	1	21	20	1		18	3	
Madison	19	5		24	18	5	1	19	5	
Mitchell	2		1	3	1	2		3		
Onslow	6	2	2	10		9	1	5	5	
Pender	14	26	1	41	3	36	2	31	10	
Swain	9	3		12	10	1	1	11	1	
Transylvania	8	1	1	10	6	4		8	2	
Yancey	12	2		14	5	9		12	2	
Totals	177	118	19	314	175	129	10	265	47	2

1982-83 White-Tailed Deer Reported Harvest

County	Sex Harvested				Total Harvest	Antlered Bucks Per Sq. Mile[a]	Weapon[b]				Location[b]	
	Antlered Bucks	Button Bucks	Does	Not Listed			Shotgun	Rifle	Muzzle-Loader	Bow	Game Lands	Other Lands
Alamance	170	3	26		199	0.81	65	96	23	15		199
Alexander	49		5		54	0.29	3	38	7	6		51
Alleghany	407	35	85		527	3.48	7	247	97	175	1	514
Anson	329	28	70	6	433	0.92	125	246	19	40	21	396
Ashe	301	14	60		375	1.24	3	163	91	118	5	361
Avery	45	4	11	1	61	0.23	3	52	2	3	56	5
Beaufort	887	54	245	2	1,188	1.68	138	983	35	26	26	1,127
Bertie	732	53	258	5	1,048	1.47	804	207	13	12	43	954
Bladen	1,249	77	401	5	1,732	1.84	1,109	585	12	16	29	1,611
Brunswick	1,037	27	174	3	1,241	1.55	1,031	192	8	3	10	1,158
Buncombe	133	44	276		453	0.29	13	433	2	2	28	424
Burke	536	24	66	3	629	1.32	46	488	37	57	249	376
Cabarrus	2		2		4	0.01		1	1	2		4
Caldwell	191	6	10		207	0.50	14	173	8	11	116	90
Camden	100	3	15		118	0.65	71	47				118
Carteret	175	1	1		177	0.47	74	94	5	3	54	118
Caswell	655	83	226	3	967	2.36	421	402	69	72	154	801
Catawba	40	6	7		53	0.22	3	28	5	16		53
Chatham	336	15	53	2	406	0.66	111	193	50	50	90	305
Cherokee	3	1			4	0.01	2	2			4	
Chowan	195	11	47	1	254	2.15	60	181	3	8		254
Clay	41		1		42	0.23	1	38	1	1	39	3
Cleveland	38	1	1		40	0.19	1	35	1	2		38
Columbus	944	50	222	5	1,221	1.46	934	242	25	5		1,221
Craven	826	41	159	6	1,032	1.60	216	758	33	18	93	866
Cumberland	728	33	241	4	1,006	1.97	110	777	19	66		1,006
Currituck	116	7	41		164	0.94	67	87		8		164
Dare	89		6		95	0.32	30	42	8	15	75	20
Davidson	304	28	71	1	404	1.03	13	265	65	58	34	352
Davie	120	4	10		134	1.01	7	77	23	26	4	130
Duplin	529	9	19		557	1.09	198	352	2	3	3	516
Durham	115	14	37		166	0.65	93	54	10	8	53	105
Edgecombe	626	49	198	13	886	2.66	424	407	17	27		886
Forsyth	15				15	0.08	2	9	2	2		15
Franklin	381	13	49	3	446	1.28	313	114	6	9	16	413
Gaston					0	0.00						
Gates	732	75	209	2	1,018	3.01	789	202	10	8	17	994
Graham	5		1	1	7	0.02		6		1	5	1
Granville	524	41	193	3	761	1.55	272	380	31	71	187	568
Greene	40				40	0.33	17	23				40
Guilford	55	4	10		69	0.18	15	37	7	9		69
Halifax	1,083	74	369	6	1,532	2.52	568	894	32	26	13	1,448
Harnett	80		1		81	0.24	53	25	1	2		72
Haywood	98	18	79		195	0.23	4	162	3	18	186	7
Henderson	137	4	3		144	0.55	6	125	3	8	105	35
Hertford	292	17	89		398	1.28	301	88	1			398
Hoke	77		1	1	79	0.31	73			6		79
Hyde	473	46	153	3	675	1.24	224	347	66	27	37	605
Iredell	161	4	11		176	0.60	6	117	26	27		176
Jackson					0	0.00						
Johnston	152	16	46		214	0.37	83	123	2	5		209
Jones	801	38	177	8	1,024	2.23	173	804	18	23	36	943

County	Sex Harvested				Total Harvest	Antlered Bucks Per Sq. Mile[a]	Weapon[b]				Location[b]	
	Antlered Bucks	Button Bucks	Does	Not Listed			Shotgun	Rifle	Muzzle-Loader	Bow	Game Lands	Other Lands
Lee	24				24	0.14	11	9		3	10	13
Lenoir	175	2	3		180	0.91	23	145	1	3	1	169
Lincoln	14		2		16	0.10	4	6	3	3		16
Macon	89		5		94	0.21	4	81	3	6	83	11
Madison	30	1	1		32	0.09		30	1	1	25	7
Martin	512	15	39	1	567	1.74	378	170	4	10		567
McDowell	208	10	18		236	0.58	11	180	23	21	176	58
Mecklenburg	15	2	3		20	0.06	11		4	5		20
Mitchell	38		3		41	0.22		34	4	3	9	32
Montgomery	875	93	304	3	1,275	2.25	163	686	213	207	240	1,008
Moore	99			1	100	0.19	83	12		1	4	93
Nash	212	16	65		293	0.74	112	168	2	6		293
New Hanover	55		22	1	78	0.59	52	22	1	2		72
Northampton	797	63	274	1	1,135	2.43	697	390	14	16	6	1,112
Onslow	895	98	412	6	1,411	1.53	1,030	291	41	41	17	1,356
Orange	261	14	58		333	1.11	108	160	32	33	3	319
Pamlico	222	12	46	18	298	1.03	29	256	2	8	7	283
Pasquotank	57	1	9		67	0.50	45	19		1		67
Pender	1,307	130	608	2	2,047	1.86	1,054	901	24	37	58	1,781
Perquimans	148	4	18		170	1.10	56	111		2		170
Person	359	11	78	2	450	1.44	218	168	22	34	12	418
Pitt	439	5	21	4	469	1.42	65	388	6	8		469
Polk	52				52	0.30	1	51			33	19
Randolph	268	22	62		352	0.54	29	211	40	72	16	333
Richmond	455	20	86	3	564	1.34	304	231	10	13	80	447
Robeson	187	3		2	192	0.41	147	42	1		1	176
Rockingham	231	15	42		288	0.64	46	191	15	36		288
Rowan	226	20	76	1	323	0.95	36	166	55	66	11	306
Rutherford	121	2	4		127	0.30	14	105	1	7	15	104
Sampson	533	1	20	5	559	0.96	224	326	3	4		559
Scotland	280	6	24		310	1.44	251	38	1	15	84	205
Stanly	144	17	39		200	0.73	24	103	32	41	20	177
Stokes	81	3	5	1	90	0.27	21	52	6	11	1	85
Surry	125	3	16		144	0.37	14	83	16	31		144
Swain	4				4	0.01		3	1		1	1
Transylvania	164	1	5	8	178	0.51	5	154	10	7	161	17
Tyrrell	78				78	0.23	24	41	10	2		78
Union	15		1		16	0.05	3	11		2		16
Vance	252	12	13	1	278	1.63	97	165	3	12	5	270
Wake	106	2	4		112	0.22	30	71	2	8	30	77
Warren	528	52	250	2	832	1.67	669	150	1	4	20	722
Washington	129	12	45	2	188	0.69	72	71	10	31	19	147
Watauga	20		1		21	0.10	3	12	3	1		18
Wayne	44	3	7		54	0.18	20	33				54
Wilkes	423	11	75		509	0.72	14	292	88	115	97	404
Wilson	11				11	0.07	8	2		1		11
Yadkin	88	1	4		93	0.52	8	66	9	10	3	90
Yancey	157	9	35		201	0.65	4	140	20	37	104	94
No County Listed	20	4	14	1	39	NA	18	18	2	1	11	26
State Total	28,727	1,771	7,252	152	37,902	0.92	15,336	18,496	1,638	2,092	3,152	33,500

[a]Square miles of forest as index of deer habitat.

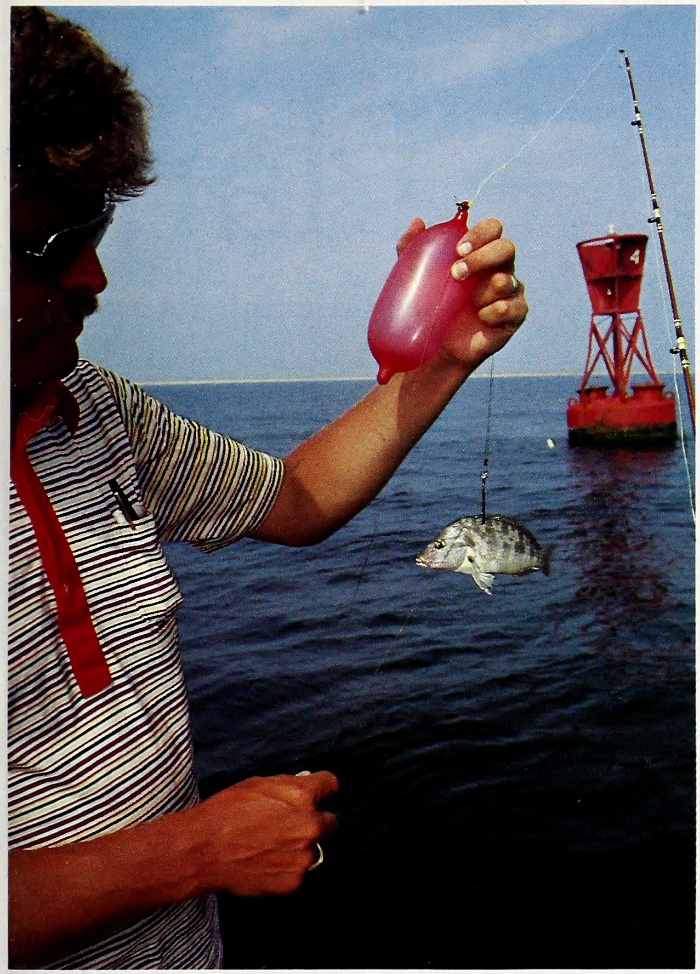
[b]Totals may not equal Total Harvest values because Cooperator-Agents failed to list on some Big Game Harvest Records.

1982-83 Reported Wild Boar Harvest

County	Male	Female	Not Listed	Total	Game Land	Other Land	Rifle	Shot Gun	Muzzleloader
Avery	1			1		1	1		
Burke	1	1		2		2	2		
Caldwell	2	2		4	1	3	4		
Cherokee	3	2	1	6	5	1	4	2	
Clay	1	2		3	3		3		
Graham	16	9	1	26	26		23	3	
Swain	1	2		3	3		3		
Watauga	1	1		2		2	2		
Wilkes	1			1		1			1
Totals	27	19	2	48	38	10	42	5	1

1982 Reported Wild Turkey Harvest

County	Turkeys Reported	Game Land	Other Lands	Weapon Used		
				Shotgun	Rifle	Bow
Alamance	28		28	28		
Alleghany	6		6	1	5	
Ashe	16		16	11	5	
Bertie	21		21	21		
Buncombe	1	1		1		
Burke	3	3		3		
Carteret	1	1		1		
Caswell	95	26	69	95		
Chatham	17	4	13	17		
Cherokee	13	13		13		
Clay	1	1		1		
Durham	1		1	1		
Franklin	1		1	1		
Graham	3	3		3		
Granville	6	1	5	6		
Halifax	11		11	11		
Haywood	1	1		1		
Henderson	2	2		2		
Johnston	2		2	2		
Macon	6	6		6		
Madison	8	7	1	8		
Martin	13		13	13		
McDowell	9	9		8	1	
Mitchell	1	1		1		
Montgomery	9	2	7	8		1
Moore	8	1	7	7	1	
Northampton	10		10	10		
Onslow	31		31	30		1
Orange	12		12	11	1	
Person	26		26	26		
Richmond	7		7	7		
Rockingham	4		4	4		
Transylvania	9	9		9		
Wake	1	1		1		
Warren	1		1	1		
Wilkes	2	1	1	2		
Totals	386	93	293	371	13	2



Even a fairly large cobia like this one caught by Boyd Pfeiffer (holding rod, opposite page) is good eating. Unlike many fish, when they reach adult sizes their flesh remains white and firm. Fishing a small, slow-swimming live bait under a balloon around a buoy is one of the best ways to catch big cobia.

anchored near us one spring, so it was clear it was their first time cobia fishing. It was a small boat like you might use on a farm pond, but perfectly safe that calm day in Pamlico Sound. When one of the men hooked a cobia, the level of their voices picked up and soon — too soon — they had it boatside. I looked up just as the fish — it must have weighed 40 pounds — twisted off the gaff and fell into the bottom of the boat with a thud. Both fishermen lay on the seats with feet and hands in the air as the fish thrashed wildly about. One of the anglers got a drink bottle after it like a club and when he missed, that aluminum boat rang like a bell. They were cursing and yelling bloody murder after a seat was knocked loose and I could see the pop bottle rising and falling and hear the clang when it struck the boat. Finally the fish hit their Styrofoam drink box and it exploded. Ice and bottles flew like shrapnel. Eventually the fish paused long enough for one of them to connect, but in the aftermath that boat must have looked like the scene of a massacre.

The other two fishing methods differ from the first in that you cast only to fish you see. Cobia tend to hang around buoys and day markers in the inlets and over wrecks from the beach to the edge of the Gulf Stream. You can stand on the bow of a boat and have someone run you slowly up to a navigation marker. Look for slow-moving chocolate brown fish circling the piling or buoy. If a fish is there (there may be several), you should cast a live bait to a point where one of the cobia will see it, but where you can get a straight pull away from the buoy when it takes the bait. Many of these fish will cut you off on the marker or its chain anyway, but there is no use casting beyond a buoy to hook a fish.

This can be a little dangerous when it's rough, so you really should wear a life jacket in case you fall overboard.

Heavy tackle is called for here, since the fish are likely to run large — some over 60 pounds — and you need to manhandle the fish away from obstructions. On conventional reels, 30-pound test is none too large. Twenty-pound is about right for spin. A 4-foot length of 60-pound test leader helps in handling the fish at boatside, but it doesn't facilitate casting. Fortunately only short lobs of a live bait are necessary.

There are likely to be one to several cobia over just about any wreck in North Carolina, but they will almost always be mixed in with amberjack, and the jacks always want your baits or lures more than the cobia. But with a little luck and technique you can catch the cobia on heavy jigs and see them take right beside the boat. Sight-jigging, as it were.

Typically, you will arrive at a wreck and your prop wash will bring the jacks and cobia to the surface. There will be many more jacks than cobia. If the jacks have not been molested recently, they are likely to rush any lure you throw over — for a while. You will pull on jacks until you have had enough and they will begin to lose interest — mercifully, because jack fishing is hard work. Sometimes, in the course of working jigs vertically for amberjacks, you will accidentally hook a cobia. More often, you will have to drop a jig in front of a visible cobia at boatside and work it insistently in front of the fish before it will take.

Two-ounce to 3-ounce jigs, white with bucktail and mylar, seem to work as well as anything for this sometimes frustrating task. White artificial worms add to the jig's effectiveness, but not as much as a squid strip or whole small squid.

Again, you will be over structure and you can be sure that any cobia you hook will go for it. You will need substantial tackle to turn them. Stout 7-foot plug rods and spin rods up to 8 feet are needed. You need a rod that will lift 6 pounds from the floor with 6 inches of line off the tip. Lines in the 20- to 30-pound class are about right, and you need 4 or 5 feet of heavy mono leader to handle the fish at boatside.

People get hurt gaffing cobia. You must be extremely careful. Be sure they are not "green" when you stick them, and, ideally, you should lift them quickly into a box, slam the lid and let them settle down before you attempt to retrieve your hook. If a "hot" one ever gets loose on the deck, there is nothing to do but back away and let it cool off. You can clean up the mess later.

Unlike a lot of fish, large cobia are just about as good to eat as the small ones. The flesh is white, fine-grained and low in oil. It smokes well, is wonderful cut into fingers, dipped into tempura batter and deep-fried, but it is most often broiled with lemon and butter. In fact, one of the common names on the Gulf Coast is lemonfish, which may derive from the popular cooking method. They are also called ling there.

But in North Carolina, they are cobia, a primitive species in some ways with no close relatives. In fish classification, they occupy a family by themselves. In spite of their decline in recent years, they still are at least as available as, for example, big channel bass, which are the only other large inshore gamefish generally accessible in North Carolina waters.

A Plot To Save Plants

Rob Gardner

Saving native wild plants is a major goal of North Carolina's Botanical Garden, and many of them are growing on this 350-acre "wilderness" in Chapel Hill.

by Lawrence S. Earley

A botanical garden is the kind of a garden you have to dress up to visit. At least that was my impression as a kid visiting the New York Botanical Garden in the Bronx, one of the world's greatest botanical gardens. On hot spring days in the humid conservatories, we would shuffle between long rows of wildly blooming flowers with improbable names. Outside, men in light suits and women in Easter pastels stooped to view the strange flowers blooming so far from their native wilds. Japanese plum *(Prunus japonica)* from China and Japan. Winter hazel *(Corylopsis sinensis)* from central China. Kousa dogwood *(Cornus kousa)* from Japan and Korea. After awhile, numbed with botanical exotica, we'd all go home to our peonies.

North Carolina's got a botanical garden, too, but it's got a decidedly downhome approach. Although the North Carolina Botanical Garden in Chapel Hill is a fine place for the Sunday visitor, the Garden's focus these days is squarely on plants in the wild. In fact, it may well be one of the only gardens more interested in keeping plants in their natural habitats than in uprooting them and displaying them.

"The goals of the Botanical Garden are education, research and conservation," says curator Rob Gardner. "But our main focus right now is native plant conservation." The fact is, says Gardner, that North Carolina's native plants — those wildflowers, bushes, ferns or trees native to the southeast — are steadily diminishing.

"It's an unbelievably big problem," says Harry Phillips, the curator in charge of propagation of plants.

"How do people usually get plants for their gardens, for example? They either go to a natural area, dig the plant up and bring it home. Or, they'll go to a nursery and buy the plant." And where do nurseries get them? They dig them up, or have someone else dig them up for them. "There's a tremendous amount of pressure on natural areas to satisfy the demand for plants — especially wildflowers." A recent survey indicated that wildflower nurseries get anywhere from 40 percent to 100 percent of their plants from the wild. That kind of de-

N.C. Botanical Garden

Bouquet of blazing star **(Liattis spicata)** *mixed with rough-leaved goldenrod greets fall visitors at the N.C. Botanical Garden in Chapel Hill. The Garden concentrates on the native plants of the southeast, and blooming plants can be seen from spring through fall. Wildflower seedlings are cultivated in the wildflower nursery (above) where botanists work developing propagation techniques for native plants.*

Rob Gardner

mand can guarantee that whole areas will be stripped of the plant.

Great white trilliums are picked from North Carolina lands by the thousands, but they are not the only plants on the pick-list. Wildflowers like Gray's lily *(Lilium grayii)* and Michaux's lily *(Lilium michauxii)*, as well as a variety of ferns are regularly offered for sale in horticultural magazines, flyers in Sunday newspapers and ads in mail-order wildflower catalogues. "North Carolina is just losing its native plant heritage," says Phillips. "Tens of thousands of plants each year are picked and sold, and the result is that these natural areas are much less interesting."

The plants that are picked may be rare and endangered plants, or more common plants. But all of them are important parts of the native landscape, and the Garden has been working to reduce some of the pressure on natural areas. One way to do this is to make common wildflowers more available to the public, thus providing an alternative to picking plants in the wild.

This is the major goal behind the plant-propagation program. "We want to generate interest in the horticultural potential of native flowers, especially wildflowers," says Phillips. "There are so many naturally occurring species that couldn't be easier to propagate from seed. Our entire orientation is in making things simpler for the backyard gardner and the nurseryman."

Techniques for growing wildflowers from seed are not generally known, and so botanists at the Garden spend a good bit of time trying to develop them. They've had success propagating showy native perennials — bee balm *(Monarda didyma)*, coneflower *(Rudbeckia fulgida)*, butterfly weed *(Asclepsias tuberosa)*, and the cardinal flower *(Lobelia cardinalia)*. The latter — a 3- to 5-foot plant with bright red blossoms that attract hummingbirds — was remarkably easy to grow, says Rob Gardner. "It's got thousands of seeds, and they're easy to collect. There's no difficulty separating the chaff from the seed. You can sow it immediately and it'll germinate. Or you can store it in the refrigerator and it will still germinate. It likes the sun, tolerates the shade and will take in both moist and dry soils." Handsome and easy to grow, the cardinal flower is this year's "Flower of the Year."

Other plants are not as easy to grow. In spite of its popularity with wildflower gardeners, the pink lady's slipper is practically resistant to growing from seed. "People have tried all kinds of things to make it grow," says Gardner, "but they can't do it." The rare bunched arrowhead *(Sagittaria faciculata)* had also been hard to propagate, but Gardner, who has worked with it for several years, says he's at a promising point in his research. "We've had trouble propagating that for a long time. There's something about the germination biology of that plant that we didn't know. But finally, last summer, we managed, we think, to discover a technique that's going to make this plant a lot easier to grow from seed."

A vigorous publicity effort follows the development of propagation techniques. Volunteers help package the seed and send them out to nurseries across the State. Garden clubs are notified to spread the word. Harry Phillips gives workshops and demon-

N. C. Botanical Garden

Rob Gardner

Plant propagation volunteers (above) clean seed and package it for shipment to commercial nurseries or private gardeners. Volunteers also locate and save endangered plants like the pitcher plant (far right) from construction sites across the State. The smooth coneflower **(Echinacea lacvigata),** *near right, can be seen at the Botanical Garden, and so can the East Coast's most impressive collection of carnivorous plants, like this insect-eating Venus's fly-trap (bottom).*

strations at nurserymen's conventions, encouraging them to produce a certain plant. Staff members write articles in popular magazines explaining the techniques.

"We feel that the main thing we can do is to develop these techniques, popularize them and introduce them to the nurserymen," says Gardner. "We want them to see that they can offer superior products to the public. They've been grown in a greenhouse, not shipped from the Appalachians to New York and then back again. They've not suffering from shock; they're healthy, strong, colorful and easy to grow. That's one very important thing we can do to take some of the pressure off the natural populations growing in the wild."

Another practical alternative to picking plants in the wild comes in the form of the Plant Rescue Program, which often operates under the shadows of bulldozers. Charlotte Jones-Roe leads this program. "Our network of volunteers usually hears about a site that is to be dug up," she explains. "They scout it, make sure it's got plants that we need; they secure the necessary permit and go get the plants. Usually we have lots of time. But a few times we have been out in front of bulldozers snorting 100 yards away.

"It's a good source of plants that are not commercially available," says Jones-Roe. The results of previous plant rescue missions are found everywhere in the Botanical Garden. Just in front of the Totten Center, the administrative and research building constructed in 1976, are galax *(Galax aphylla)*, from a mountain site where a golf course was put in, and ferns from the site of the new UNC Athletic Center. The rare and endangered shortia or Oconee's Bells *(Shortia galacifolia)* is growing not far away.

"Shortia is a good example of a plant with tremendous horticultural potential," says Phillips. "It's an endangered species and protected by the State, but it's easy to grow, attractive and could be produced by nurseries. In New England shortia has long been a favorite ground cover, but it's not caught on down here."

The North Carolina Botanical Garden is situated in a pine and mixed deciduous forest just down the road from the new UNC Athletic Center on South Campus, and across busy 15-501 Bypass. The forest was originally part of a 300-acre tract of still wild land known as Mason Farm and owned by the university. Wild turkeys inhabit this land, as do deer, gray foxes, raccoons and a variety of hawks and other creatures. Mason Farm received a certain fame when John K. Terres, former editor of *Audubon* magazine, wrote a book about it called *From Laurel Hill to Siler's Bog*. "It is in these small wild places, refuges kept wild by their isolation and the protection of the animals in them,

N.C. Botanical Garden

N.C. Botanical Garden

that the naturalist finds the last Frontier," he wrote.

Perhaps it's the closeness to this little wilderness that explains the Garden's emphasis on native wild plants of North Carolina and the southeast. Or perhaps botanist W.C. Coker laid the tracks way back in 1927 in his original proposal for the Botanical Garden: "to establish in Chapel Hill . . . a collection of all the trees and shrubs native to North Carolina." It took 25 years before the UNC Board of Trustees set aside 70 acres of Mason Farm for the development of a botanical garden, but the Garden has grown steadily since, encompassing about 350 acres today.

In 1961, Dr. C. Ritchie Bell was named director of the Garden, a post he still holds. Ken Moore is superintendant of the Gar-

N.C. Botanical Garden

Maroon and yellow calleopsis **(Coreopsis tinctoria),** *below, blooms in late spring, a little-known native plant of North Carolina. Calleopsis seedlings are sold at the annual spring wildflower sale at the Botanical Garden, (above), and seed to this and other plants can be ordered throughout the year (see facing page). Longleaf pine seedling (top, right) grows in the Coastal Plain habitat at the Garden. Visitors can also tour the Sandhills habitat and the Mountain habitat.*

N.C. Botanical Garden

Laurence S. Earley

den. "We don't have all the southeastern flora," Bell says, "but we do have about 1,200-1,500 species, or one third of all the southeastern species. We're exceedingly fortunate in our location. We have all kinds of habitat tracts — cool bluffs, hot shale slopes, creek bottoms — a variety of habitats which host thousands of botanical species. We've planted a lot more, too."

Highlights of a visit to the Garden are the three special habitats around the Totten Center: a Coastal Plain habitat, a Sandhills habitat and a mountain habitat, each exhibiting the dominant plants of the larger regions. "We don't have a good coastal dune," says Bell, "But we've got just about everything else."

The Botanical Garden is laced with nature trails that take the visitor through a typical Piedmont area, with a pine woods, a flood plain and a mixed-deciduous hardwood forest of oak, hickory, and beech trees. Almost completed is the Herb Garden — "one section of the Botanical Garden that's not made up of native plants," says Charlotte Jones-Roe. Medicinal herbs are grown and labeled, and there are culinary herbs and toxic (medicinal herbs that in certain doses may be poisonous). Soon to come is an Indian herb garden, "to show what our ancestors learned from the Indians when they came here."

Perhaps the most popular section of the Garden is its collection of carnivorous plants. "North Carolina has one of the highest number of carnivorous plants in the world," says Gardner. "So it's natural for us to have such a diverse collection. "We've got the nicest display of carnivorous plants on the East Coast, especially the pitcher plants. We have almost every conceivable kind of hybrid and all the real rare species, and we're doing a lot of work on seed germination."

Nearly 100 volunteers aid the efforts of the small staff of botanists at the Garden. They rescue plants, process seeds and sell them at plant sales, plant herbs in the Herb Garden, and plant specimens in the new Plant Family Garden, which will group plants of taxonomic affinities, thus providing an invaluable teaching aid.

Which is merely to say that there is a lot going on at the N.C. Botanical Garden, and a lot to see. But the Garden is not just another pretty face. It's doing important work to preserve the natural heritage of the State. And in its efforts on behalf of the natural landscape, the Botanical Garden is a powerful force for conservation.

Native Plants For The Garden

The Botanical Garden offers seed to 34 wildflowers, four trees and shrubs, two vines, and four carnivorous species. They also offer instructions on the cultivation of these native plant species. A complete list is provided below. For information on Garden membership, or more information about the NCBG Seed Program or the Wild Flower of the Year Project, write N.C. Botanical Garden, Totten Center 457-A, University of North Carolina, Chapel Hill, N.C. 27514.

Wildflowers

Yarrow *(Achillea millefolium)*
Nodding Onion *(Allium cernuum)*
Blue Star *(Amsonia tabernaemontana)*
Columbine *(Aquilegia canadensis)*
Jack In The Pulpit *(Arisaema triphyllum)*
Butterfly Weed *(Asclepias tuberosa)*
White Wild Indigo *(Baptisia australis)*
Bur Marigold *(Bidens polylepis)*
Pink Turtlehead *(Chelone lyonii)*
Chicory *(Chichorium intybus)*
Calliopsis *(Coreopsis tinctoria)*
Gaillardia *(Gaillardia pulchella)*
Sunflower *(Helianthus tomentosus)*
Maryland Golden Aster *(Heterotheca mariana)*
Alumroot *(Heuchera americana)*
Rose Mallow *(Hibiscus moscheutos)*
Seashore Mallow *(Kosteletskya virginica)*
Blazing Star *(Liatris spicata)*
Cardinal Flower *(Lobelia cardinalis)*
Great Lobelia *(Lobelia siphilitica)*
Bee Balm *(Monarda didyma)*
Wild Bergamot *(Monarda fistulosa)*
Horse Mint *(Monarda punctata)*
Beard-Tongue *(Penstemon digitalis)*
Beard-Tongue *(Penstemon smallii)*
Coneflower *(Rudbeckia fulgida)*
Black-Eyed Susan *(Rudbeckia hirta)*
Coneflower *(Rudbeckia triloba)*
Fire Pink *(Silene virginica)*
Rough-Leaved Goldenrod *(Solidago rugosa)*
Stokes' Aster *(Stokesia laevis)*
Carolina Bush Pea *(Thermopsis villosa)*
Foam Flower *(Tiarella cordifolia)*
Ironweed *(Vernonia noveboracensis)*

Trees and Shrubs

Beauty-Berry *(Callicarpa americana)*
Sweet-Shrub *(Calycanthus floridus)*
Persimmon *(Diospyros virginiana)*
Sweet Bay *(Magnolia virginiana)*

Vines

Passion Flower *(Passiflora incarnata)*
Greenbrier *(Similax walteri)*

Carnivorous Plants

Venus's Fly Trap *(Dionaea muscipula)*
Sundew *(Drosera filiformis)*
Pitcher Plant *(Sarracenia minor)*
Pitcher Plant *(Sarracenia purpurea)*

Return Of The Bluebird

Nearly everyone's favorite songbird seems to be making a comeback after years of decline.

by Mike Overton

Driving along a country road, you are not immediately aware that the small birds perched on the telephone wire ahead are anything special. Then they fly, dropping off the wire and soaring head-high across the field towards a distant fence. Like electric blue sparks, they dart over the golden broom straw, and suddenly you know they are eastern bluebirds. If seeing these birds brings happiness, you've got lots of company.

Indeed, it is a truly indifferent person who does not notice such moments of colorful grace, and callous is the heart that is not warmed by their unexpected presence. Furthermore, during the past 30 to 40 years, the sighting of a bluebird has not been a common event in many areas.

Those of us approaching middle age, or past it, may recall a time when bluebirds seemed to be far more abundant. They were in gardens, sitting on roadside fences and wires, and flitting through yards. Then they began to disappear, and by the middle of 1950s it was not unusual to go an entire summer without seeing even one. Some of us blamed competition from sparrows and starlings; others thought it might be pesticides or indiscriminate shooting, but no one really knew. Only one thing seemed certain. The eastern bluebird population was rapidly declining, and what may be rural America's favorite songbird seemed almost destined to disappear.

It was a loss widely bemoaned, and not just by ornithologists, because the eastern bluebird *(Sialia sialis)* has been identified with love, trust and happiness since the first days of the colonies. Favored by artists, featured by poets and universally loved for their beauty and song, bluebirds are also allies of farmers because of their fondness for insects that are harmful to crops.

What happened to them? Why did their number decline so drastically, and what has caused the recent encouraging upswing in their populations?

Though man has historically benefitted from bluebirds, it is now clear that many of men's activities also brought these colorful songbirds to the point where their future was threatened. Some ornithologists believe that this decline may have resulted in the disappearance of more than 80 percent of the bird's original population. Indeed, conservation groups such as the Wilderness Society, National Parks and Conservation Association, and the Maryland Ornithological Society considered the birds endangered even though they were never officially listed as an endangered species.

It is now fairly clear that this decline was the result of a variety of problems. Their food supply was disrupted through massive land clearing and the extensive use of insecticides. During the winter months, the eastern bluebird depends on berries as a main source of food because of the absence of insects during that time of year, but land clearing has cut down the number of trees and bushes that produce those berries. Insects are the main source of food for the eastern bluebird during the warmer months, but the use of insecticides and herbicides have not only killed many bluebirds outright, these chemicals have also reduced their food supplies. Poisoned insects that are eaten and fed to young birds have often resulted in increased mortality.

Destruction of habitat has also created nesting shortages for bluebirds. Traditionally bluebirds nested only in cavities found in trees. Extensive lumbering and the removal of dead trees in order to plant young trees steadily depleted suitable cavity-nesting sites. Fence posts and other wood

Karl Maslowski

Return Of The Bluebird

structures that were once nesting sites are now being replaced by metal structures unsuitable for nesting.

Both the English sparrow and starling were imported to the United States in the mid and late 1800s, and the overpopulation of these species has caused a very serious problem for the eastern bluebird. English sparrow and starling habitat needs are similar to that of the bluebird. English sparrows are very aggressive and will destroy bluebird nests, and even remove eggs and peck the young birds to death. In some cases, sparrows build their nests on top of dead young birds.

The starling, like the bluebird, seeks cavity-nesting sites, and this creates competition for sites. The bluebird usually fares poorly because the starling is larger and much more aggressive. Along with massive land clearing that has already cut out many nesting sites, this competition has played a major role in the bluebird's decline.

Snakes, raccoons and flying squirrels have also caused great problems for bluebirds. Snakes and raccoons will search out the eggs and young birds for food, and flying squirrels will take over bluebird nesting sites when the sites are located near trees.

One of the biggest causes of the bluebird's decline — especially in North Carolina — may have been tobacco farming. Jack R. Finch of Bailey in Nash County is one of several bluebird experts who arrived at this conclusion. Finch, who is president of Homes For Bluebirds, Inc., has been a bluebird enthusiast for many years, and had dedicated himself to helping these birds rebound from their flirtation with extinction. In addition to his independent research and work with nesting boxes, food sources and predators, he discovered that tobacco curing barns were death traps for bluebirds. Finch learned that the old pot-type oil tobacco barn curer used by farmers during the late 1940s and early '50s contributed greatly to the decline of the eastern bluebird. In search of nesting cavities, bluebirds entered the 6-inch smokestacks located at the top of the barn only to be trapped in the burners or fire chambers after traveling some 20 to 30 feet down the flues.

Finch's most recent research project, however, may prove to be, over the long run, even more important. He had developed a promising method which will prevent predators such as snakes and raccoons from gaining access to bluebird nesting boxes. His invention is a flexible predator-preventive skirt that attaches to the bluebird pole and prevents ground predators from climbing the pole and entering the bluebird box.

To test his device, Finch constructed two snake pits, one large one with a smaller one located inside the larger one. Black snakes were gathered and placed in the larger snake pit. The snakes were taken from the larger pit and placed into the smaller pit where a bluebird pole had been erected in the center. The snakes were at first allowed to climb the pole to the top and gain access to the large pit. Once they learned to use this avenue of escape, the snakes were again placed into the smaller pit, and allowed to climb the pole. This time, however, they encountered a predator-preventive skirt which had been attached mid-way up the pole. The snakes climbed up the pole until they encountered the skirt connection and were unable to go further. The snakes could not climb around the outside of the skirt because the flexible skirt cloth blocked them. Since the skirt would prevent the snakes from climbing any further up the pole, any nesting box attached to the top of the pole was protected.

With Finch's discovery of the predator-preventive skirt, nesting boxes for the bluebird can be constructed which will be safer.

Of course, Finch has not been the only one who has contributed valuable time and research to help bluebirds. Many other individuals and organizations have also helped, including those listed at the end of this article. And while the bluebird has had an uphill battle, these efforts are beginning to pay off. In recent years, bluebird populations in many areas have begun to rebound from their earlier low levels.

The shortage of cavity-nesting sites has been alleviated by widespread programs to build and locate bluebird boxes throughout the eastern United States. The boxes are carefully monitored by organizations and individuals during each of the bluebird's three nesting cycles. Records are kept on the dates of nesting, number of eggs laid in each clutch and the number of young hatched.

Groups and individuals have also planted shrubs, trees and vines that produce a high quantity of berries around natural nesting sites and nest boxes, and these have given bluebirds a much needed source of food to carry them through the harsh winter.

Over the past two decades, the banning and control of dangerous insecticides like DDT has also helped not only the bluebird to survive but many other wildlife species.

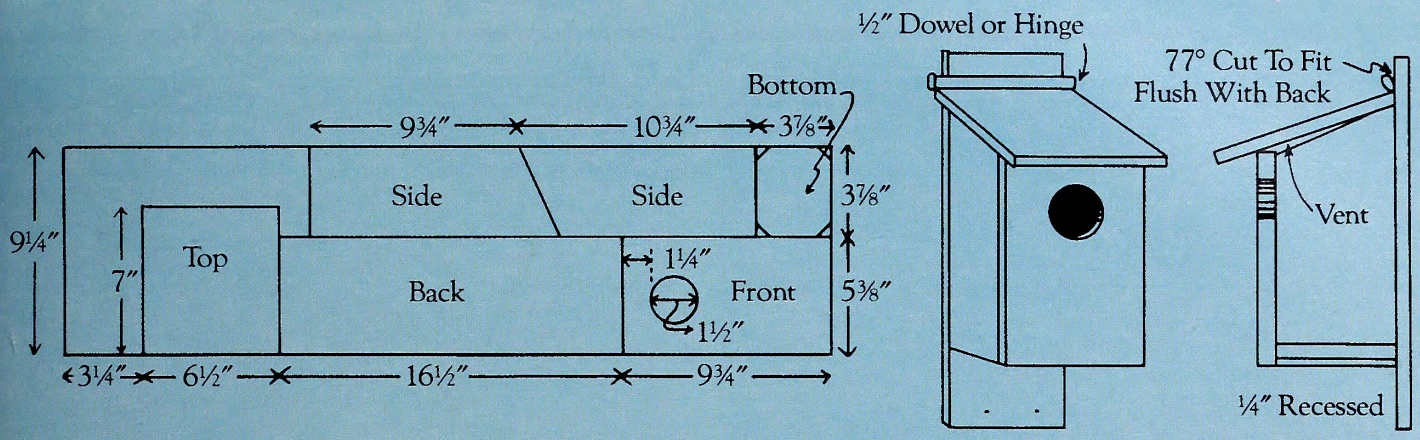
Building nest boxes and planting foods which are useful to bluebirds are activities that most anyone can do to help with the restoration of these birds, but perhaps the

Mike Overton

Mike Overton

Jack Finch of Bailey mounts a bluebird nesting box on a pole above his experimental flexible skirt which has shown great promise in preventing predators like blacksnakes from reaching the box. Finch is testing the skirt in a series of enclosures housing snakes which have been conditioned to climb poles. So far, the flexible skirt has foiled their attempts.

Build A Bluebird Box



Materials List

1. 1 x 10-inch lumber—33 inches.
2. 6½ inches of ½-inch wood dowel or a metal hinge.
3. One 1½-inch wood screw with washer.
4. 20 to 25 1½ to 1¾-inch nails.
5. Wire or ring-shank nails to attach box to post.

Construction Notes

1. Dimensions given are for ¾-inch thick lumber.
2. Make entrance hole precisely 1½ inches in diameter and 1¼ inches from the top.
3. Provide space between top and sides for ventilation.
4. If possible, use 1¾-inch galvanized siding nails or aluminum nails.
5. Round corners on bottom of box for drainage, and recess bottom ¼-inch.
6. Roughen inside of front board by making notches with a saw or holes with an awl or drill, to assist young in climbing to entrance hole.
7. Top of the box should be attached at the back by a ½-inch wooden dowel or metal hinge, and in front by a 1½-inch wood screw to facilitate easy opening for inspection and cleaning.
8. Drill two or three holes in the back panel of the box above and below the enclosure, to aid in quick, easy attachment to pole or post.
9. Do not add any type of perch to the box; it will only serve to attract sparrows.

Site Selection

Site selection is the single most important step in having a successful bluebird program. Bluebirds utilize only a very specific type of habitat for nesting and will only rarely deviate from it. In general, bluebirds prefer open areas with scattered trees where the ground is not covered with tall undergrowth.

There are three general areas which should be avoided when selecting a nest site:

1. Avoid placing nest boxes in towns or within the immediate area of farm yards. House sparrows will invariably occupy every such nest box.
2. Do not place boxes in heavy timber. Bluebirds prefer sites associated with timber, but more at the edge of a clearing rather than in the timber stand itself.
3. Since bluebirds feed almost entirely on insects during the nesting season, boxes should not be placed in or near areas of widespread insecticide use.

Installation and Maintenance

1. Place boxes at 150 to 200-yard intervals.
2. Mount boxes about 5 to 7 feet above ground level. Fence posts make excellent mounting sites.
3. Clean boxes as soon as possible after a successful hatch. Bluebirds will not utilize the same nest box unless it is cleaned.

Courtesy of NEBRASKALAND Magazine

first step is to join forces with others who are concerned. In addition to Finch's Homes For Bluebirds, Inc. in Bailey, N.C. 27807, members of the Carolina Bird Club, Inc., P.O. Box 1220, Tryon, N.C. 28782 are also active in bluebird restoration projects. You may also wish to join the North American Bluebird Society, P.O. Box 6295, Silver Spring, Maryland 20906.

Already, bluebird sightings are up in rural North Carolina, and although the total population may never reach the highs that existed before about 1930, the signs are encouraging. Once again you can drive country roads with a reasonable expectation of seeing this bird as Henry Thoreau observed him. "He is brilliantly arrayed, gentle in manner and carries the sky on his back," wrote Thoreau over 130 years ago. And once again the bluebird's song inspires poets as it did James Whitcomb Riley years ago when he described their arrival in spring. "In across the orchard come, soft as an angel's wing, a breezy, treesy, beesy hum, too sweet for any thing."

Jack Finch would have no trouble appreciating that, nor would anyone else whose heart is gladened by a patch of flitting blue and a song that is free to anyone who cares to listen.

Bald Eagle Restoration Set For Mattamuskeet

Written and Edited by Mark Taylor

A long-lost friend is returning to the North Carolina coast this summer. Several state and federal agencies and private conservation organizations plan to introduce bald eagles to the Lake Mattamuskeet National Wildlife Refuge as part of a national effort to restore breeding populations of the endangered birds.

"We plan to introduce bald eagles to the refuge through a hacking program," said Stuart Critcher, head of the Wildlife Commission's Habitat Conservation Section. "Hacking is a means of introducing young raptors to the wild without their growing dependent upon man. The young birds are held in cages and are fed and monitored by workers and volunteers, but the birds never see who cares for them. This keeps the eagles from learning to associate food with man."

Agencies and organizations involved in the program include the U.S. Fish and Wildlife Service, Tennessee Valley Authority, Wildlife Commission, N.C. State University and East Carolina University. The North Carolina Wildlife Federation has also contributed a $2,000 grant to fund the project, while refuge workers from the U.S. Fish and Wildlife Service will build the towers and provide protection for the birds. The Fish and Wildlife Service's endangered species office in Asheville will provide technical guidance.

The eaglets used in the project will be obtained from the U.S. Fish and Wildlife Service's captive-breeding program for raptors in Patuxent, Maryland. Adult birds used in this breeding program have been rehabilitated from injuries — many have been shot — but have handicaps that would make it impossible for them to survive in the wild. Young birds obtained from this program are used in hacking programs nationwide.

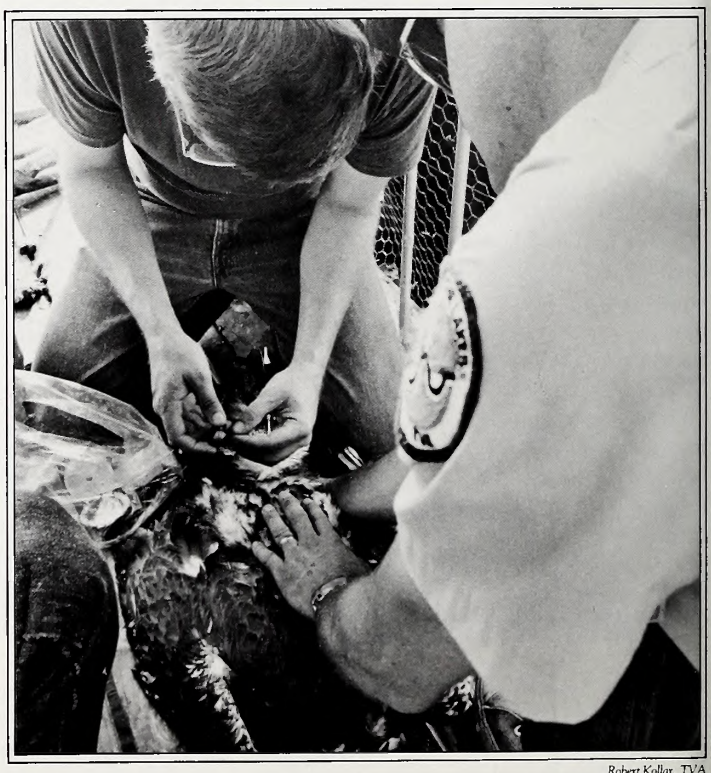
"We plan to release two eaglets at Lake Mattamuskeet this summer," said Dr. Don Hammer, a raptor specialist with the Tennessee Valley Authority who has been active in programs reestablishing populations of birds of prey throughout the Southeast. "The birds will be held in the cages on the hacking towers for about six weeks. Then, they are released to fend for themselves. Once free, their movements are monitored by tiny radio transmitters that are attached to the birds.

"Often, the young birds will leave the hacking area soon after release and may not return until they are mature — four to five years later. These young birds may wander over the whole country, going wherever the wind takes them. However, they usually return to the area where they were fledged to nest. This is why young birds must be used to re-establish eagle populations — older birds would simply leave the area and never return."

Hammer adds that the refuge and adjacent sounds offer three things that eagles need — good habitat for fishing (the bald eagle's diet is 90 percent fish), large trees for nesting, and remoteness from man.

Robert Kollar, TVA

Better Days Ahead: *Bald eagles were common on the North Carolina coast until pesticides decimated their populations. Banning DDT and similar pesticides helped clean up the environment, and bald eagles and other raptors are increasing their numbers. A restoration project for bald eagles will begin this summer at the Lake Mattamuskeet National Wildlife Refuge.*



Robert Kollar, TVA

Getting Wired: *Before immature bald eagles are released in restoration projects, small radio transmitters are attached to the birds. Biologists monitor their locations, and aid them if possible when trouble arises.*

Improvements in environmental quality have helped make a comeback possible.

"The situation with pesticides has improved considerably in the past decade," said Critcher. "The persistant organo-chlorine pesticides like DDT which caused eggshell thinning and reproductive problems in eagles and other raptors are no longer in use, and concentrations in the environment are not causing serious problems. This has allowed raptors to stage a comeback throughout their ranges."

Tar Heels shouldn't expect to see bald eagles on the coast overnight — a long-term program will be needed to establish a population. The birds mature at a relatively late age, have low reproductive rates, and a natural mortality rate of about 50 percent before reaching maturity.

"It would probably take five to 10 years to introduce enough birds to establish a nesting population of bald eagles around Lake Mattamuskeet," said Hammer. "If this first year goes well, we may expand the program by building additional hacking towers and releasing more birds in the future."

Bald eagles were once common on the North Carolina coast, but declined in the 1950s and 1960s as the use of pesticides and the destruction of habitat became common. In recent years, a handful of eagles have been spotted in the State. Several birds have nested in coastal areas, although no young have been hatched in the past decade.

Wildlife A Half-Billion Dollar Industry

How much is wildlife worth to the economy of North Carolina? Over a half-billion dollars annually, according to figures compiled by the U.S. Fish and Wildlife Service. Throughout the State, hunters, fishermen and other wildlife enthusiasts pump over $580 million into the economy of North Carolina through wildlife-based recreation. Much of the money goes for purchasing equipment, food, lodging, gasoline, hiring of guides, and other expenditures. In turn, this sum generates about $23 million annually in State and local taxes.

The impact that wildlife has on the economy of North Carolina is featured in a new slide-tape program, produced by Ted Dossett of the Wildlife Commission's Division of Conservation Education, entitled *The Business of Wildlife*. Here are some highlights from that presentation:

— In 1980, almost 100 million Americans participated in wildlife-based recreation — including hunting and fishing. A total of $41 billion annually is spent on this recreation.

— Americans spent 113 million days afield hunting big game in 1980. In North Carolina, big-game hunters spend a total of $81 million annually on their sport. In addition, North Carolina waterfowl hunters and small-game hunters spend over $80 million annually. The total contribution of hunting to the economy of North Carolina exceeded $167 million last year.

— Fishermen contribute heavily to the State's economy. In 1980, anglers spent over $373 million on fishing in North Carolina. Freshwater fishing alone was worth over $157 million to the economy of the State.

— North Carolina sportsmen spend over $125 million annually on such large items as boats, trailers, campers and four-wheel drive vehicles.

— Non-consumptive wildlife activities — including observing, feeding and photographing wildlife — are among the nation's most popular pastimes. In 1980, about 83 million people nationwide took part in these activities, and spent a total of $15 billion on this recreation.

— Ninety percent of the funds used by the Wildlife Commission come from sportsmen through the purchase of licenses and permits and excise taxes on sporting equipment.

— Every dollar spent by the Wildlife Commission returns over $50 to the economy of North Carolina.

Copies of *The Business of Wildlife* are available free to organizations and schools for programs. For more information, contact the N.C. Wildlife Resources Commission, FILMS, 512 N. Salisbury St., Raleigh, N.C. 27611.

Terry Shankle

A Good Investment: *Wildlife associated recreation is worth almost a half-billion dollars to the economy of North Carolina. Every dollar spent by the Wildlife Commission on wildlife programs — like the restoration of the wild turkey — ultimately returns over $50 to the economy of the State.*

Carolina Notebook Reaches Young People

Educators with an interest in North Carolina's outdoors and natural resources now have a useful teaching aid in a publication called the *Carolina Notebook*. The *Carolina Notebook* is an environmental-education primer aimed at North Carolina students between the ages of 8 and 12, and is published six times per year. Subscriptions are available free to educators, schools, and leaders of youth groups. The *Carolina Notebook* is produced cooperatively by a small group of volunteers representing the UNC Sea Grant Program, N.C. State University, N.C. Agricultural Extension Service, and the N.C. Wildlife Resources Commission. Printing and mailing costs have been paid by the Wildlife Commission and with a grant from the North Carolina Board of Science and Technology.

Now in its first year of production, the *Carolina Notebook* is being used by approximately 4,500 educators and leaders of youth groups across the State. Each issue features a selected natural-resource topic. Past issues, for example, have featured North Carolina's geology, forestry, unique natural habitats, and wildlife species. The stories are written in an interesting, easy-to-read style. The *Notebook* also includes suggested learning activities, references for teachers, additional sources of information, and an upcoming calendar of events for educators.

Beginning with the 1983-84 school year, the *Carolina Notebook* will be funded by the Wildlife Commission's Carolina Conservationist nongame and endangered species contribution program. Wildlife art prints have been offered for several years through the Carolina Conservationist program, with the proceeds going to help support nongame wildlife programs. This year, a limited number of posters featuring the Duane Raver painting of North Carolina's state symbols which appeared in the March issue of *Wildlife In North Carolina* will be offered to help support the Carolina Notebook. These four-color posters measure 16 inches by 24 inches, include information on each of the State symbols, and will be offered for a minimum contribution of $2. Posters may be ordered from the N.C. Wildlife Resources Commission, Division of Conservation Education, 512 N. Salisbury St., Raleigh, N.C. 27611. Information on the Carolina Conservationist program — and subscriptions to the *Carolina Notebook* — are available from the same address.

Ken Taylor

A Good Cause: *Funds from the sale of this print of the State's symbols — painted by well-known North Carolina wildlife artist Duane Raver — help support the publication of the* **Carolina Notebook,** *an environmental education primer for teachers.*

Natural History Photo Contest Under Way

Some of North Carolina's wildlife may be viewed indoors. Each year, the Natural History Photography Contest — sponsored by the N.C. Museum of Natural History — showcases some of the best nature photographers in the State.

The 1983 Natural History Photography Contest is currently under way, and entries will be accepted through June 30. Entries must depict natural scenes in North Carolina, or plants and animals that are native to the State. Categories include black-and-white prints, 35mm color slides, and color prints. Winning photographs and selected entries will be displayed at the museum in Raleigh from July 11 through August 31.

There is a $2 entry fee for each photograph, and up to three photos may be submitted in each category. Each entry should include the name, address and telephone number of the photographer. Return postage and a self-addressed envelope should be included with each entry. A $150 grand prize will be offered, and cash prizes for first, second and third place will be offered in each category.

Entries may be mailed to the N.C. Museum of Natural History, Nature Photography Contest, P.O. Box 27647, Raleigh, N.C. 27611.

Poached Fish Almost Always Taste Better

Most native Carolinians were introduced to bream, redbreast, crappie and other panfish at an early age. My affinity for panfish stems from the days when I was just large enough to toddle after my older brothers to the nearby marl hole for an afternoon of cane-pole fishing. For the unenlightened, a "marl hole" is somewhat akin to a small pond.

In northeastern Pender County where I was raised, the soil is black and rich but very acidic — and it takes a lot of lime to keep it productive. Lime is expensive, but lying six feet below the surface of Pender County and most other coastal areas is a layer of white "marl" — the skeletal remains of ancient whales, turtles, dinosaurs, fish, oysters, clams and other sea-life. When spread on farm land, marl serves the same purpose as lime. Nearly every farm near my home had a huge pile of marl somewhere out on the back forty — and beside it was the pit from which it had been dug. The calcium-rich waters of the "marl holes" literally teemed with panfish.

Looking back, I feel certain that it was an oversight on behalf of the school administration to begin summer vacation in late May when the "perch," as we called them, were bedding in the marl holes. I'm sure that they never would have intentionally set the stage for such unbridled pleasure. With bare feet and rolled-up jeans, a new cane pole, a can of freshly dug worms, and a warm spring sun baking bare backs — such bliss bordered on the sinful!

We landed an occasional bass from our fishing hole, but panfish were our mainstays — and my brothers and I almost always carried home a stringer of fish that was impressive in numbers if not in size. Each fish was dutifully cleaned and found its way to the frying pan.

I still consider fried bream, warmouth and redbellies among the tastiest of freshwater fish, but a few years ago a friend introduced me to poached fish (cooked, not illegally caught). He usually poaches the smaller panfish on his stringer and serves them with cocktail sauce or as an appetizer or party hors d'oeuvre. I've found they are equally as good as the main dish.

Here are some directions for poaching fish, and recipes for a couple of sauces that I like with them. You may also want to try your own favorite seafood sauce.

Poached Panfish

4 whole cleaned panfish (bream, crappie, etc.)
2 cups water
1 teaspoon salt
1 bay leaf
1 freshly squeezed lemon or 1 tablespoon of lemon concentrate

Place water, salt, bay leaf and lemon juice in a pot large enough to hold the four panfish. Cover, and bring to a boil for 3 minutes. Reduce heat to simmer. Add fish and cook for 6 to 10 minutes, or until the fish flakes when tested with a fork. Garnish with fresh parsley and lemon wedges and serve with one of the following sauces as a main entree (or try your favorite sauce). Or remove flesh in large chunks and serve as an appetizer with your favorite cocktail sauce.

Lemon-Chive Sauce

2/3 cup margarine or butter
3 tablespoons chopped chives
2 tablespoons lemon juice
2 teaspoons grated lemon peel
1/2 teaspoon salt
1/3 teaspoon black pepper

Melt margarine or butter in saucepan, and add remaining ingredients. Mix thoroughly and pour over poached fish.

Orange Sauce

1 cup orange juice
1/4 cup sugar
1 teaspoon nutmeg
1 tablespoon (approximately) cornstarch to thicken
1 tablespoon sherry (optional)

In a medium saucepan, combine orange juice, sugar and nutmeg. Bring to a rolling boil, add cornstarch, and stir. Remove from heat, add sherry, and spoon over poached fish. These sauces also go well with baked or broiled fish.

— *Curtis Wooten*

Take Marlin 401

Do you have trouble distinguishing a catfish from a marlin? Or do you sometimes dream of catching a marlin while you're pulling in a catfish? If so, consider attending the annual Sport Fishing Short Course at Cape Hatteras from June 19-24.

The course, sponsored by N.C. State University, features classroom instruction on surf fishing, inshore and offshore fishing, rigging of baits and tackle, and other subjects. Two afternoons are spent surf fishing, and two all-day trips to the Gulf Stream are featured.

"We usually catch a large variety of fish during the course," said Alice Strickland of the N.C. State Department of Continuing Education. "These often include dolphin, wahoo, Spanish mackerel, bonito and sailfish. There is also a good chance that someone will hook, and possibly catch, a tuna or marlin."

For more information, contact the N.C. Division of Continuing Education, Alice Strickland, P.O. Box 5125, Raleigh, N.C. 27650.

Salty Scenes

Laurence S. Earley

If you have some good photographs of North Carolina coastal scenes, you may want to enter them in the Bogue Banks Nature Photography Competition and Exhibit. Now in its seventh year, the event is sponsored by the Carteret County Arts Council, N.C. Marine Education and Resources Foundation, and the Bogue Banks Marine Resources Center.

Photographs of plants, animals and natural scenes in coastal areas of North Carolina are eligible. The three categories include black-and-white prints, 35mm color slides, and color prints. Entries will be accepted at the Bogue Banks Marine Resources Center between June 2-5. An exhibition and awards ceremony will be held on July 11 at 3 p.m. at the Marine Resources Center.

Judges for the competition include Ken Taylor, chief photographer for *Wildlife In North Carolina* magazine, Neil Caudle, director of communications for the UNC Sea Grant program, and Jeff Jones of the Carteret County News-Times.

For more information, contact the Bogue Banks Marine Resources Center, Atlantic Beach, N.C. 28512.

Calendar of Events

May 4-8
Cherokee Trout Rodeo. Prizes for the largest fish caught in Reservation waters. For more information, contact the Cherokee Merchant's Association, Cherokee, N.C.

May 6-8
Eleventh annual Spring Wildflower Pilgrimage at Asheville. Guided field trips, slide shows, and lectures. For more information, contact UNC-Asheville, Dr. James Perry — Biology Department, P.O. Box 8467, Asheville, N.C. 28814.

May 7
"Day in the Gardens" at the University Gardens at UNC-Asheville. For more information, contact Dr. Robert Kemp, 76 N. Griffing Blvd., Asheville, N.C. 28804.

May 7
Historical Arts and Crafts Demonstration and Old Boat Flotilla at Swansboro.

May 7
10th Annual Big Ivy Ramp Festival at the Community Center in Barnardsville.

May 8
26th annual Outdoor Art Show at the Rocky Mount Arts and Crafts Center.

May 12-15
Fourth annual East Coast Open King Mackerel Tournament at Carolina Beach. For more information, contact the East Coast Open, P.O. Box 300, Kure Beach, N.C. 28449.

May 14-15
Canoe Weekend and Folk Music Festival at Latta Plantation Park in Huntersville. For more information, contact the Mecklinburg County Department of Parks and Recreation, 8711 Old Monroe Road, Charlotte, N.C. 28212.

May 14-15
3rd annual Spring Triathlon (biking, running, canoeing) at the Nantahala Outdoor Center in Bryson City. For more information, contact the Nantahala Outdoor Center, Box 41, Bryson City, N.C. 28713.

May 21
Person County 9th annual Spring Arts Festival. Bluegrass, crafts, clogging and square dancing. For more information, contact the Person County Arts Council, P.O. Box 923, Roxboro, N.C. 27573.

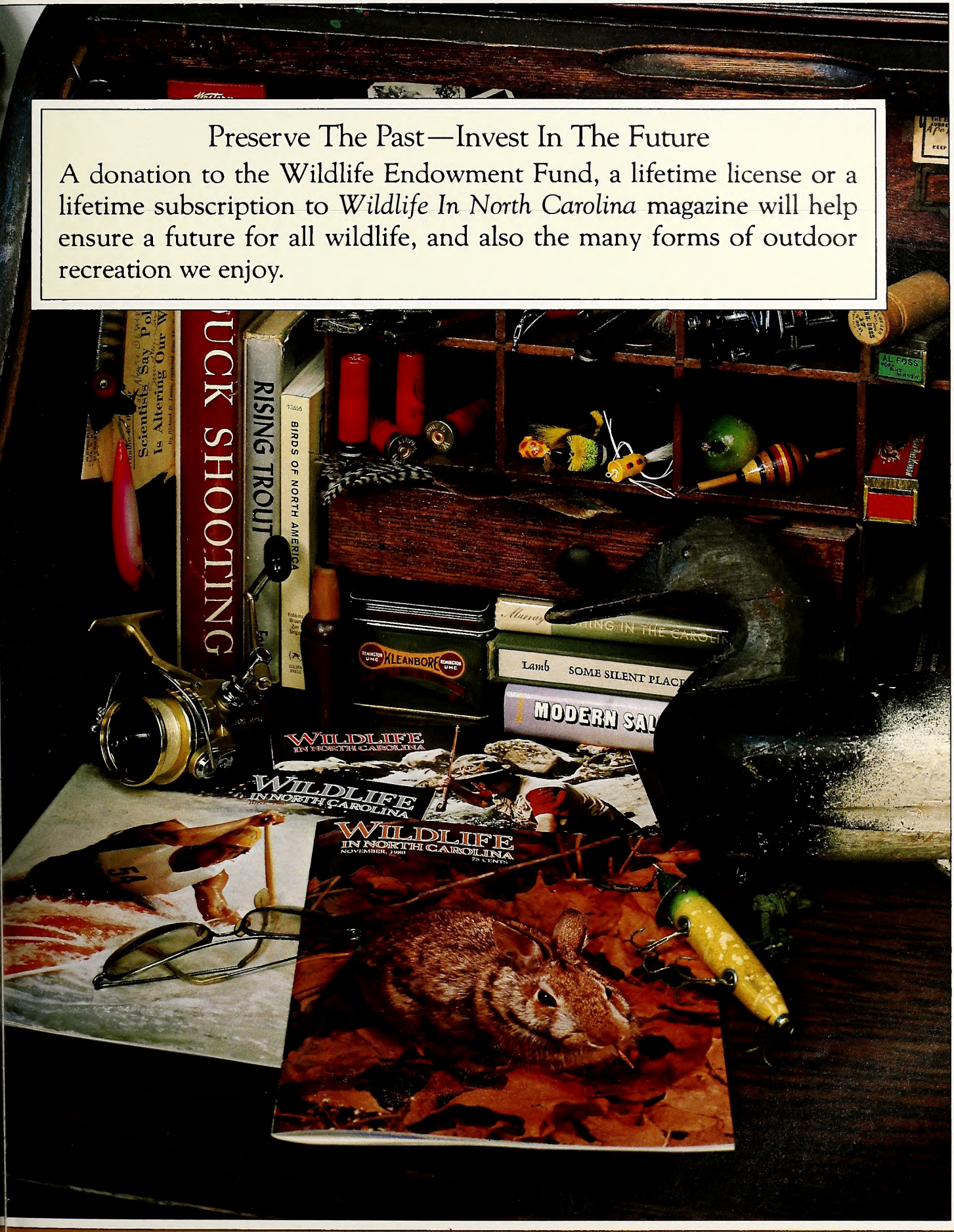
May 23-30
Kerr Lake Spring Art Show at State Recreation areas on Kerr Lake in Henderson.

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina,* and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status on February 28, 1983

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	3822	$1,101,382.68
Lifetime Hunting License	51	8,372.63
Lifetime Fishing License	112	18,145.82
Lifetime Subscriptions to Wildlife In N.C.	136	14,349.95
Contributions	—	13,521.00
		Fund Total: $1,155,772.08


Preserve The Past—Invest In The Future
A donation to the Wildlife Endowment Fund, a lifetime license or a lifetime subscription to *Wildlife In North Carolina* magazine will help ensure a future for all wildlife, and also the many forms of outdoor recreation we enjoy.
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RISING TROUT
BIRDS OF NORTH AMERICA
KLEANBORE
Lamb
WILDLIFE IN NORTH CAROLINA
WILDLIFE IN NORTH CAROLINA
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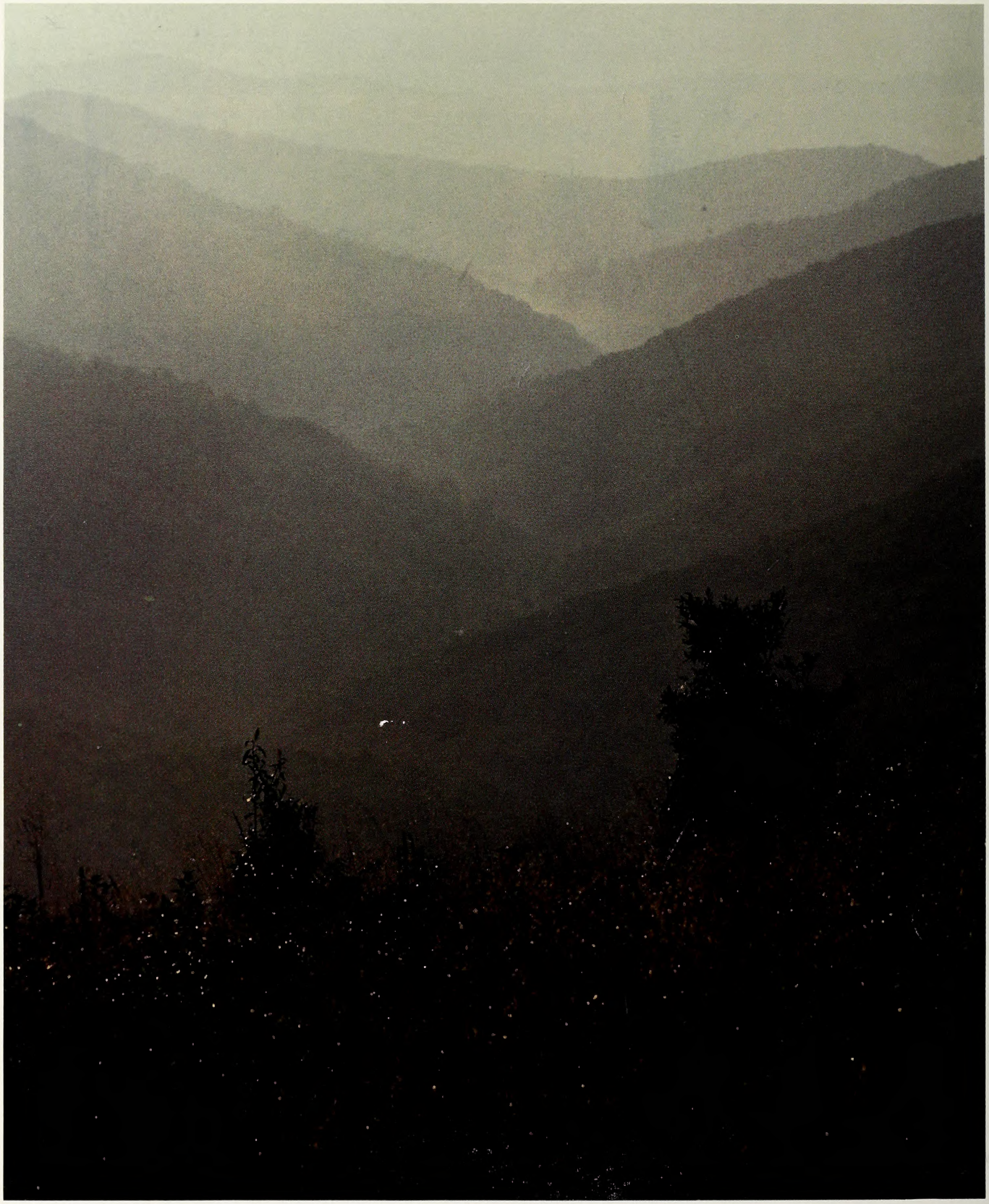

Where Eagles Soar

The mountains in the Shining Rock Wilderness Area may again be home to the magnificent golden eagle if restoration efforts succeed.

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WILDLIFE IN NORTH CAROLINA

JUNE, 1983 75 CENTS

When Pines Were King

by Jim Dean

In 1976, 200 years after this nation's declaration of independence, I found an English penny dated 1757 in a field just east of the Chowan River. How fascinating it would be, I thought, to know where that penny had been; to follow it as it jostled across the Atlantic on a wooden sailing ship in the pocket of some settler or sailor. How had it been spent, and for what? What tales could it tell?

It is supposition, of course, but it is likely that this penny had been exchanged at least once as part of North Carolina's important early commerce in naval stores — the production of tar, pitch and turpentine. It's a good guess because at that time, these products were among the few that could provide anything in the way of wages.

N.C. Archives and History

Finding a way to make a living was not as easy in this colony as it was in the others. Early records depict North Carolina as a backwater of ignorance and poverty. Around 1700, for example, there was little or no industry or manufacturing, and our most important crops — tobacco and cotton — had to be shipped out of ports in Virginia or South Carolina. Major crops were grown by big landholders, and soil exhaustion was taking a toll even then. Roads or trails were few and poor, and the colony was widely known as the "Ireland of America," or "a good place to be from." Most people simply squatted in crudely built cabins, growing a little corn or potatoes and hunting, the worth of their ownings often being less than $20.

Yet, there was one resource that was found in ample abundance. Everywhere you looked, there were pines, and even the poorest squatter could find a source of income from them limited only by his industry and endurance.

The builders of ships like the one that brought the penny saw the potential of this seemingly endless sea of virgin pine. The tall, straight trees were perfect for masts and spars, and the byproducts of these pines — tar, pitch and turpentine — were equally important. Pitch (very thick tar) was used to help caulk hulls to prevent them from leaking, and tar strengthened and kept the rigging from rotting. Standing rigging such as shrouds (which held the masts erect) were routinely daubed with tar. In fact, the word tar was slang for sailor, and one of the origins of the term Tar Heels derives from the production of tar here. Turpentine, another pine product, was used to make paints and stains — both vital needs to ship building. Small wonder the products were called naval stores or supplies.

Early Carolinians soon learned to tap the pine trees for crude turpentine in much the same manner that sugar maples are tapped for sap to make syrup. Throughout the winter, pine trees were "boxed" or cut with special axes so that a cavity was made at the base of the living tree's trunk which would collect about a quart of crude turpentine. The bark was removed above the box and the tree grooved to create a flow into the box. The sap would begin to flow about mid-March and gradually fill the box, then be removed with a ladle and collected into barrels. It has been estimated that one man could tend approximately 3,000 trees in the course of a season (though some estimates range to 10,000 trees), and produce about 100 barrels of crude turpentine at a value of eight shillings per barrel.

Local industries were developed to distill the crude sap into spirits of turpentine and rosin, and also produce tar and pitch. Tar was generally extracted from the wood of old fallen pines or lightwood by heating the wood to high temperatures in a clay kiln. A fire at an opening at the top of the clay kiln forced the sap downward where it was collected as tar from a wooden pipe at the bottom. Pitch was made by boiling tar in an iron kettle, or by pouring the tar into a hole in the ground and setting it on fire until it burned into pitch.

Charles L. Paul, writing in the April 1967 *North Carolina Historical Review*, reports that by the 1740s, these products had become a major factor in the economy of the Beaufort area, and some were being produced as early as 1709. Some production no doubt existed here and elsewhere, perhaps before 1700.

Through the 1700s and late into the next century, the naval stores industry prospered and spawned a number of associated industries such as ship building throughout eastern North Carolina. In 1845, Wilmington's chief export was still turpentine and its products, but production began to decline later in the century as trees produced less sap and increased lumbering made inroads on the pine forests. Scattered turpentine production continued into the 20th century, although the value of pine as timber has doomed any major efforts at reviving the industry. In some places where there are remnants of the early pine forests, you can still find old trees with box scars, or perhaps find a penny that might have been dropped two centuries ago by a settler carrying a boxing ax. But like the tall wooden ships, our naval stores industry has sailed into history.

June, 1983
Volume 47, No. 6

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

CONTENTS

4 **Second Season At Mattamuskeet** *by Joel Arrington*
The lake is better known for hunting, but the fishing is also good for a wide variety of species.

8 **Ding Darling's Dream** *by Mark Taylor*
Darling's tough environmental cartoons over 50 years ago changed the face of the nation and helped establish more effective wildlife management.

12 **Two Days In John Green's Swamp**
by Lawrence S. Earley
There are still wild places left in the State, and the 140-square mile Green Swamp is one of the most interesting.

22 **Digging A Canoe** *by Lawrence Musselwhite*
At Crusoe Island in the Green Swamp, they still make boats the old-fashioned way. They dig them.

24 **The Hawk That Fishes** *by Curtis Wooten*
Ospreys are common again in much of North Carolina, but unlike the bald eagle, their production never faced extinction here.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

Back Of The Book *edited by Mark Taylor*

Cover *North Carolina's first State waterfowl stamp painted by well-known wildlife artist Richard Plasschaert is now available in prints through art dealers, Ducks Unlimited, and the N.C. Wildlife Federation, and a portion of the funds from the sale of these prints will be used to benefit waterfowl in the State.*

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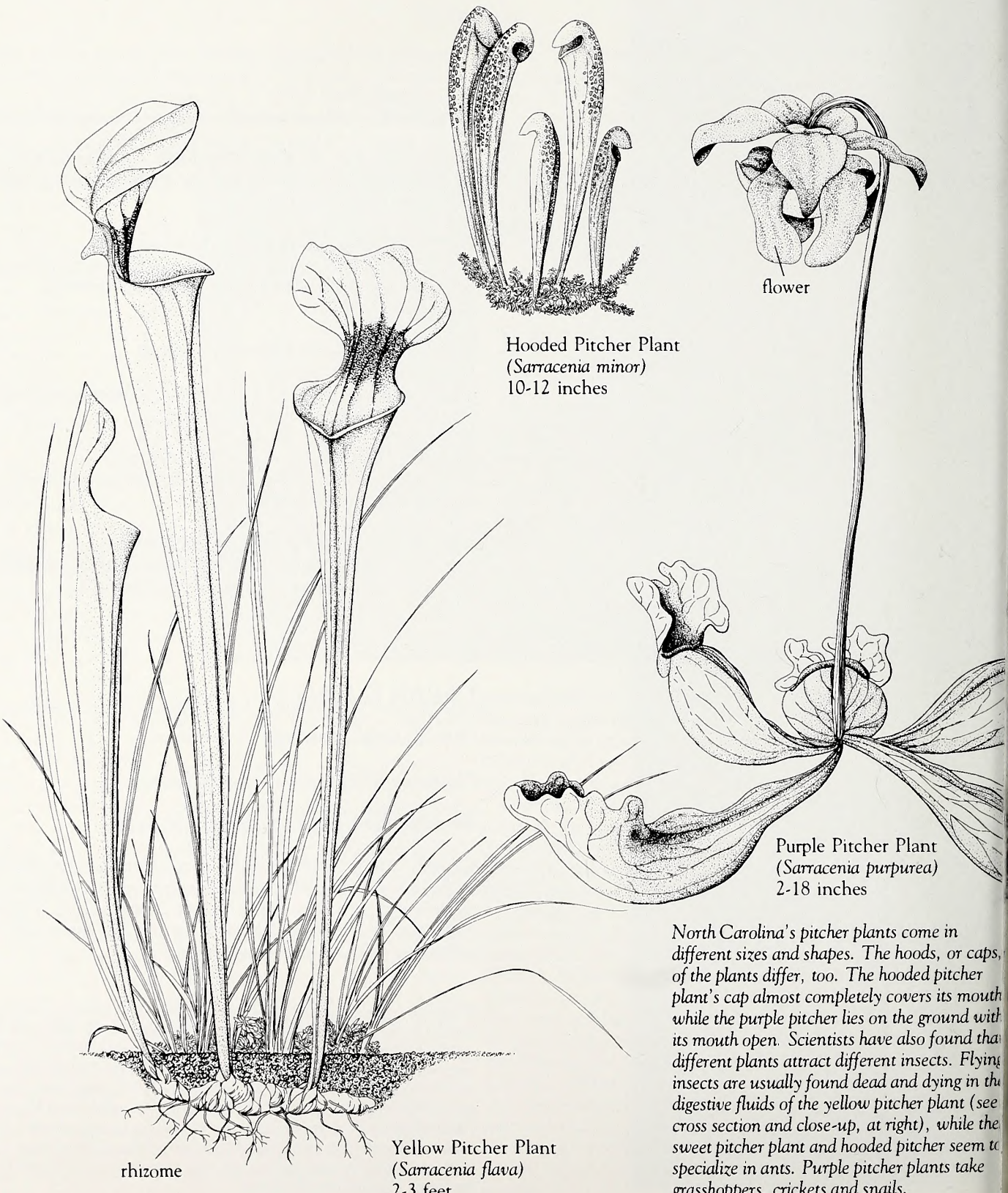
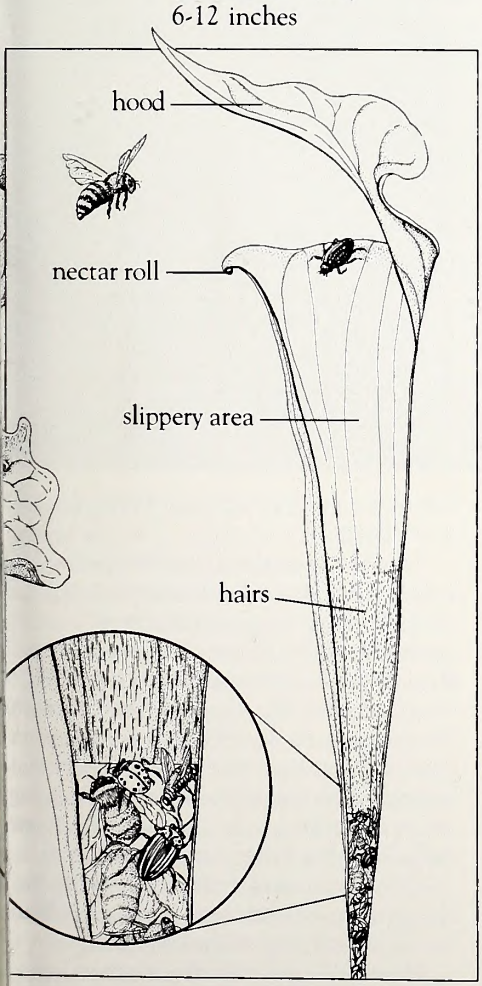


North Carolina's pitcher plants come in different sizes and shapes. The hoods, or caps, of the plants differ, too. The hooded pitcher plant's cap almost completely covers its mouth while the purple pitcher lies on the ground with its mouth open. Scientists have also found that different plants attract different insects. Flying insects are usually found dead and dying in the digestive fluids of the yellow pitcher plant (see cross section and close-up, at right), while the sweet pitcher plant and hooded pitcher seem to specialize in ants. Purple pitcher plants take grasshoppers, crickets and snails.

The Alluring Pitcher Plant

written by Lawrence S. Earley/illustrated by Carol Lerner

Sweet Pitcher Plant
(Sarracenia rubra)
6-12 inches



On the wet edges of North Carolina's southeastern savannahs grows a deadly little plant with an unusual appetite. With its tall, pitcher-shaped green or yellow leaves, sometimes splashed with red, the pitcher plant is lovely to look at. And yet is is a plant with a bite, so to speak, because insects that are lured inside its humid interior may lose their footing and plunge into its depths. Once fallen, few ever emerge.

The pitcher plant shares this insect-eating trait with about 44 other carnivorous plants in North America, including several found in great numbers in North Carolina — the Venus's flytrap, the bladderwort, the sundew and the butterwort. The *Sarracenia* family of pitcher plants ranges from Canada to the Gulf States, and four of them grow in North Carolina — the yellow pitcher plant *(Sarracenia flava)*, the hooded pitcher plant *(S. minor)*, the purple pitcher plant *(S. purpurea)*, and the sweet pitcher plant *(S. rubra)*. They are found most commonly in the State's southeastern wetlands, but also in wet mountain habitats.

The pitcher plant is a curious mix of baits and lures that slowly draw the insect inside. On the outside of the leaves are tiny glands that secrete a sweet-smelling nectar. An ant or a flying insect may be attracted to the nectar, and follow the fragrance up to the rim of the pitcher's mouth where the nectar glands are most numerous. Enticed into the mouth by the heavy nectar flow in this area, the insect encounters a tilted waxy surface on which it slips and slides. Ultimately it falls down the plant's chute, and the trap has been sprung. At the bottom, the chute is too narrow to allow the insect to spread its wings, and downward pointing hairs prevent it from walking up to the mouth. In time the insect dies and is dissolved in a pool of digestive juices which the plant produces.

Although the digestive juices are powerful enough to dissolve small snails, some insects can live in this lethal broth unharmed. The larvae of one mosquito species hatch and swim in the fluid until they emerge as adults. How do they escape being digested? No one knows for sure.

Another mystery is just why the pitcher plant developed its carnivorous habit. One common explanation begins with the fact that the pitchers and other carnivorous species live in a very inhospitable environment. Few plants can grow in the wet, acid soils where the pitchers thrive, so competition is reduced. But this acid environment doesn't provide all the essential nutrients the pitcher plant needs, and, scientists say, the plant developed a "taste" for insects in order to supplement the scarce nutrients it gets from the soil.

It is no hypothesis that pitcher plants not only tolerate fires, but require regular fires for survival. Without fire, woody shrubs and other plants would invade the wet areas where the pitchers live. Acting as tiny wells sucking up the water, these other plants can draw down the water table over a period of years. The wet habitat which the pitcher plant needs may disappear, and eventually the pitchers are replaced by a thick understory of shrubs and grasses. But a fire will eliminate the shrubs, leaving the pitchers unharmed because their perennial rhizomes are safely underground.

Elegant and deadly, the pitcher plant is another fascinating example of how nature adapts life to even the most hostile environment. A plant that eats insects is unusual, but it's an important part of nature's plan. ⇳

More of Carol Lerner's graceful illustrations of pitcher plants may be found in her children's book, Pitcher Plants: The Elegant Insect Traps *(New York: Morrow and Co., 1983), $11.00.*

SECOND SEASON AT MATTAMUSKEET

Good fishing awaits anglers at this famous waterfowl hunting lake.

written and photographed by Joel Arrington

For some years, I was a canal fisherman at Lake Mattamuskeet. On the way to the beach and back in the spring and fall, I'd stop off to walk the canal banks and toss a Devil's Horse or Johnson Silver Minnow, watching for snakes.

It was strictly bass fishing, and often the results were gratifying. I never caught a big fish — about 4½ pounds was the best I ever did — but there was more or less dependable action on decent largemouths.

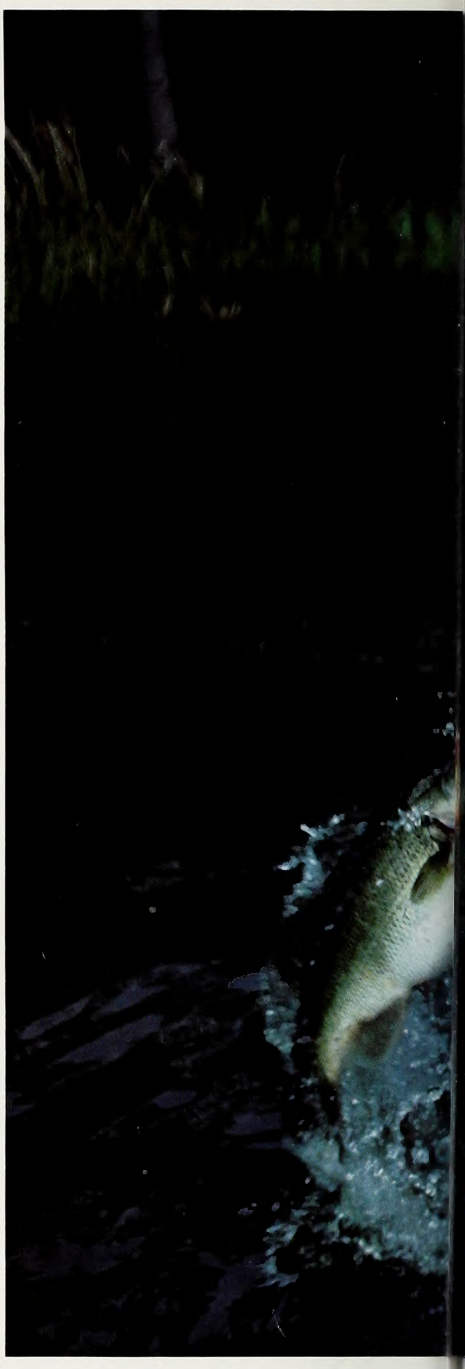
One fall day, I saw someone catch a striped bass at a culvert on the causeway that crosses this big natural lake in eastern North Carolina. It took only minutes for me to pull over and rig up and soon I had a 3-pound striped bass.

Another time, we waded among cypress trees on the north shore, casting popping bugs and weedless streamers, but, except for one fish, that trip did not pay off despite the good reputation this kind of fishing has at Mattamuskeet.

Still, most of my trips to Hyde County were for duck and goose hunting, and I never actually got on the lake in a boat until just recently. The reason was partly that I never could work up much enthusiasm to fish a lake that averages 2½ feet deep. But Bob Hester, who lives on the lake shore and runs a hunting lodge at Fairfield, encouraged me to join him in July to fish "the holes." Nick Sisley came with us.

Now, a "hole" in Lake Mattamuskeet, I learned, is nothing more than a slight depression. It might be 6 inches to a foot deeper than the surrounding bottom, but in July, even when the water feels like it's close to body temperature, fish of astonishing variety concentrate in these depressions.

Hester told us to bring light spin tackle and white Beetle Spins. We did and caught largemouth bass, white perch, bowfin, spotted gar, white and channel catfish, bluegills and chain pickerel. The catfish were caught on bait, but everything else hit the small Beetle Spins. And all this in spite of the fact that there was an algae bloom occurring at the time — green, slimy gook wrapping up our lures after just a few turns of the reel handle. Most of the strikes came instantly when the lures hit the water, but quite a few fish took lures festooned with algae. It was astonishing. Action continued right through mid-day July heat until dark when we went in.



There is no telling what size fish get activ after sunset.

Lake Mattamuskeet is so shallow and it bottom is so littered with stumps and timber that you cannot run a large outboard safely. About 10 horsepower is the limit and even small motors should be operated carefully. This is a fortutitous limitation to those of us who disparage giant outboards on metal flake, candy colored, high speed bass boats buzzing about our fishing holes. That July, we saw only one other fisherman. He was in a 12-foot aluminum johnboat like ours. In the spring you will have a bit more traffic but not much, according to Hester.

When you look into the origin of Lake

Though bass fishing can be good at times in shallow Mattamuskeet Lake, it is the wide variety of fish species that makes this large, natural lake an interesting spot for anglers. Wading the shoreline produces bass in the spring, and bluegills are a good bet for ultra-light enthusiasts.

Mattamuskeet, you encounter a mixture of legend and fact. Algonquin Indians allegedly built fires in the peat soil, burning out the depression that now forms the lake. Perhaps lightning caused the fires. There is a theory that Mattamuskeet, along with some other lakes in the Coastal Plain was formed by meteor showers in prehistoric times. Whatever its origin, early settlers found this large lake on the peninsula between Albemarle Sound and Pamlico Sound and, about 1914, enterprising farmers undertook to drain it and grow bounteous crops.

Various companies tried to make a go of it, installing the largest, at the time, pumps in the world. Bankruptcy finally prevailed in 1932 and the federal government acquired the lake in 1934 to establish a waterfowl refuge. Many Tar Heels know of Lake Mattamuskeet's rise and fall as a Canada goose hunting mecca, but not as many are aware of the excellent duck hunting that still occurs there in season nor of the varied fishing that is available for most of the year.

Largemouth bass are still the prime attractor, but the panfish and striped bass are a considerable asset. Rough fish add variety and take up the slack between strikes from gamefish.

Anglers interested only in largemouths probably should fish weedless spoons or large spinnerbaits most of the time, and topwater lures early and late. The small, white Beetle Spins we used caught bass, but to fish selectively for bigger largemouths, you probably should use artificials weighing about a half ounce. Yellow and black Devil's Horse lures have periodically been effective for me in the canals, and I went through a phase when I

used only #2 Mepps Spinners with gold blades. I have heard of largemouths topping 10 pounds from this lake, but according to Homer Robbins, the local wildlife enforcement officer, fish larger than 2½ to 3½ pounds are not terribly common. The lake is not noted as a trophy bass hotspot.

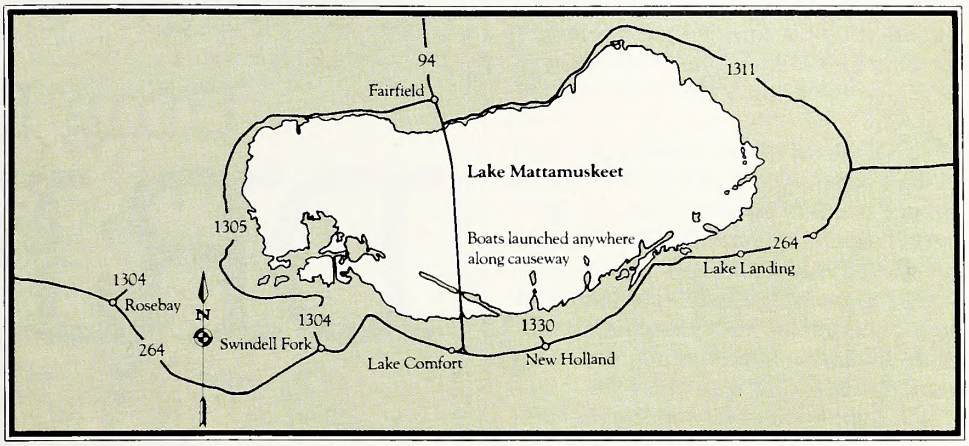
Mattamuskeet's stripers are caught mostly in spring and fall. They are school-size fish usually weighing under 6 pounds, but occasionally someone catches one over 15 pounds. Probably 90 percent are caught at the culverts under the lake road (causeway) because stripers like moving water. When the wind shifts, it moves water around, concentrating bait and stripers. Other good locations are where canals exit the lake, but only when there is a good flow. White, ½-ounce bucktails work well for stripers, and these fish will also hit Beetle Spins.

In addition to the species we caught, there are other kinds of catfish and panfish. Big crappies are caught in early spring, although nearby Alligator River is far better for this species. Robin (redbreast sunfish) sometimes gather where canals enter the lake, and shellcrackers occur, but primarily this is a bluegill lake. In the spring they concentrate to spawn and if you can find a bed of the big dark ones in May, you will have a good time.

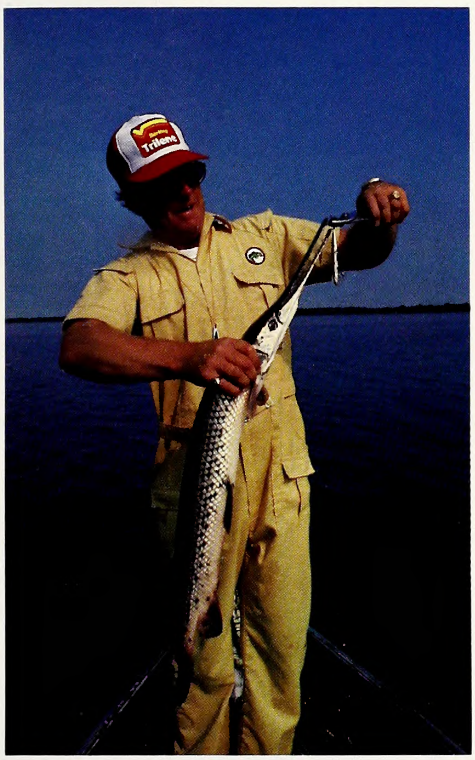
Most of the lake is under federal ownership, although there is some private shoreline on the north side. The fishing season is closed during the waterfowl season. Canal fishing peaks in April and May and in October and November. I suspect the open-water fishing does too, but it also holds up through the summer. I am fascinated with the idea of casting big topwater lures some June night.

Most fishermen who go on the lake in a boat just slip their craft in from the lake road or down a canal bank; however, there are two ramps. On the west end is the Hodges Canal, also known as the Rose Ba

Because Mattamuskeet averages 2 1/2 feet deep, only small boats are suitable. Some fly fishermen like to wade for bass, but lures and bait will produce many different species, including gar (near right) and chain pickerel.



In addition to lake fishing, canals bordering lake also offer good fishing, especially those on south and west side.



Canal, with a federal ramp. On the south side of the lake, and the east side of the lake road, is another ramp. If your boat is so big you have to use a ramp, the motor is probably too big to operate safely.

Giant farms surround Lake Mattamuskeet, and although the Lake is clear and shallow, there is much fertilizer runoff. This makes Mattamuskeet a prime candidate for algae blooms such as occurred last July, although they have not been regular occurrences. Windy days are particularly bad because the growth is stirred up from the bottom. Although we found the situation irritating, it really did not impede our fishing very much.

I think we could have sunk the boat with white perch. Small spinners tipped with a strip of fish are particularly effective. Anyone who wants to catch a cooler full of perch for the freezer is likely to succeed.

Mattamuskeet is not the best fishing hole in America, but it is good. It also has a certain old-time charm that takes me back to barefoot days and simpler times. I'll be back.

This conservationist had a vision of America that was far different from what he saw in the 1930s, and his biting political cartoons literally changed the face of the nation.

by Mark Taylor

Ding Darling's DREAM

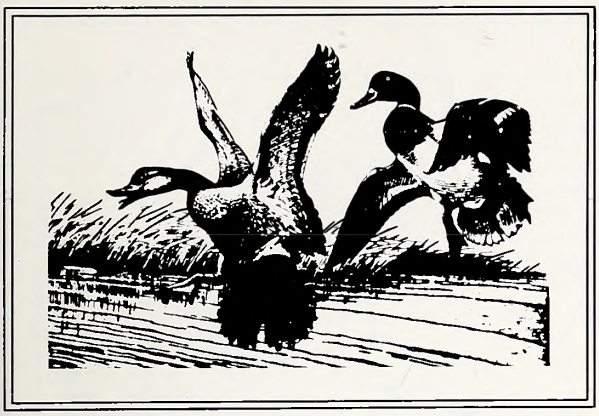
The rich Michigan farm had changed over the years. The young man looked in sorrow at the worn-out fields which could no longer grow a crop. Ten years earlier, the rich, black topsoil — long since washed away — had supported a rolling sea of wheat. The clear creek of his youth was now a silt-clogged ditch. The well had run dry, and the apple orchard had been chopped down. The tired land added to the desolation he felt at attending his Uncle John's funeral — some of the happiest days of his life had been spent here as a boy, working the land alongside his uncle.

"This was my first conscious realization of what could happen to land, what could happen to clear-running streams, what could happen to bind wildlife and human life when the common laws of Mother Nature were disregarded," he wrote. The sight of his uncle's abandoned farm made a deep and lasting impression on the young man, and gave direction to his life.

The man was Jay Norwood "Ding" Darling, and today he is remembered as one of our great conservationists. His contributions to conservation were legion. He was instrumental in founding the National Wildlife Federation, helped organize the Iowa Fish and Game Commission into a model agency, established the national wildlife refuge system, and made the federal "duck stamp" a reality. Above all, though, he was an accomplished political cartoonist. For almost a half-century, polluters, inept bureaucrats, corrupt politicians, game hogs, and world leaders who plunged nations into disastrous wars suffered the penetrating ridicule that flowed from Ding's pen.

"Ding" Darling was born in 1876 in Norwood, Michigan — the son of a Methodist minister. However, the family soon moved to Iowa, where Ding grew up in Sioux City. At the close of the 19th century, Iowa was a wonderful place to be a boy. The frontier was still a recent memory, and young Ding saw boatloads of buffalo hides being shipped downriver from the last of the great buffalo hunts. The flats along the Missouri River teemed with waterfowl, a hunter's paradise. During the summers, Ding would cross the river and work as a cowboy on ranches in neighboring South Dakota. And a steady stream of immigrants passed through Sioux City, lured west by the dream of a free homestead on the prairie. Nature's bounty seemed endless.

At the age of 18, Ding had no inkling that he would spend his life as a conservationist — or an artist. He wanted



As chief of the Bureau of Biological Survey, Ding Darling was instrumental in the passage of the federal "duck stamp" bill in the 1930s. He also painted the design for the first federal duck stamp in 1935. Since the program began, hunters have raised over $200 million for acquisition of national wildlife refuges through the purchase of duck stamps.

Ding loved Iowa, and was disturbed by the changes he saw in the land in his lifetime. This cartoon was one of his favorites.

to be a doctor, and enrolled in Beloit College in Wisconsin. His medical career quickly floundered as he flunked all but his most basic courses. However, he ably served as managing editor of the college newspaper, and more important as art director of the college yearbook. His brief job as art director nearly ended his academic career.

For his own amusement, Ding often sketched caricatures of his friends. With no ill intentions, he turned his talent towards the faculty of Beloit College — dropping the middle letters of his last name, and signing his creations in the yearbook with the nickname "Ding." The professors were not amused, and Ding was suspended for a year. Eventually, he returned to graduate from Beloit College, and turned to newspapering to finance his dreams of medical school.

Ding quickly found a berth as a cub reporter on his hometown paper, the Sioux City Journal. He had no intentions of drawing cartoons again, but a tough story changed the situation. Ding was covering a courtroom battle, and attempted to photograph an elderly attorney who hated publicity. Taking umbrage, the elderly barrister — with cane in hand — charged the young reporter. Ding narrowly escaped by jumping out the courthouse window, and was pursued down the main street before finding safety in the Journal offices. He had his story, but no photo. Hurriedly, he drew a sketch of his pursuer, and showed it to his editor, explaining the situation. The editor liked the art, and both the story and sketch were published. Ding was soon illustrating a regular, humorous feature for the Journal entitled "Interviews That Never Happened" which lampooned Sioux City's finest citizens. The series was very popular with everyone but its subjects, and Ding soon abandoned the Journal to become a full-time cartoonist for a larger paper, the Des Moines, Iowa, Register.

Ding's cartoons in the Register quickly attracted national attention, especially those featuring President Theodore Roosevelt. As a staunch Republican, Ding found a kindred spirit in the great conservationist. In 1911, the New York Globe offered to syndicate his cartoons. Full of ambition, Ding left for the big city.

The New York experience proved to be a nightmare. Ding found that he no longer had full control of his subject matter, as he had in Iowa. He was also having difficulty drawing because of a badly healed broken elbow, suffered when he fell from a horse.

Despondent, Ding returned to Iowa in 1913, where he resumed his old job at the

Des Moines Register. The situation soon improved, however, A doctor reset his elbow, and he was again able to draw without pain. In 1916, the New York Herald Tribune syndicated his cartoons and Ding had the best of both worlds. He was a nationally featured cartoonist — earning over $100,000 per year — and was able to live in his beloved Iowa.

As his cartooning career blossomed in the 1920s, Ding became increasingly involved in conservation issues. Through his cartoons criticizing pollution and waste of natural resources, Ding had become a national spokesman for the conservation movement. He was also one of the founders of the Iowa Chapter of the Izaak Walton League.

During this time, Ding forged a close friendship that would last a lifetime with a rising star named Herbert Hoover — who also hailed from Iowa. After he became president, Hoover often wistfully commented that the only time he could spend alone was when he was "fishing or praying." Ding was often Hoover's companion on outdoor outings, and recalled a story which shows a rare streak of playfulness in an austere president largely remembered for his hollow promises of better times on the eve of the Great Depression.

"One day when he and I were out horseback riding in the Great Smoky Mountains, we plotted to duck away from the cohort of body guards that usually rode ahead and behind, and sneaked off on a side trail that was hardly visible and rode like hell until we felt pretty safe," Ding wrote. "Then we took another side trail and wound up at an old, deserted observation tower of the Forestry Service. We hitched our horses off in the brush, climbed up into the top of the tower, and spent the whole day there — cooked our own lunch, built a dam in a little creek that ran near the tower, caught a mess of trout for the frying pan, but the most fun was watching from the top of the tower the Secret Service men scouring the countryside to find the President. It is the only time in my life that I ever saw that man really happy and unrestrained."

Darling was deeply disturbed when Hoover lost his campaign for the presidency. He turned his energy towards two things — working to establish the Iowa Fish and Game Commission as a professional organization free of partisan politics, a goal he accomplished through the Izaak Walton League in 1931, and lampooning Franklin Delano Roosevelt at every opportunity. Although Ding freely admitted that his friend Hoover had done

No one liked hunting and fishing more than Ding Darling — and no one was harder on unethical, "slob" sportsmen. This cartoon appeared in 1937 — not long after Ding made sweeping changes in federal waterfowl regulations which drastically reduced waterfowl seasons and bag limits, limited shooting hours, outlawed the use of live decoys, and restricted hunters to shotguns capable of holding only three shells.

Conservation is a global cause, and Ding felt that squandering the world's limited natural resource could only result in disease, famine and ultimately war. Although he is best known for his conservation cartoons, Ding also spent most of his life campaigning for a worthwhile league to outlaw war.

nothing for wildlife or conservation, ironically he was bitterly opposed to FDR who claimed that his administration's conservation achievements would even outshine Theodore Roosevelt's. Ding's distrust of FDR was based on his dislike of the New Deal. He felt these programs would destroy private initiative, and might ultimately lead to a welfare state.

Imagine Darling's surprise when he — a regular Iowa delegate to the Republican National Convention — was asked by FDR in 1934 to take the top post of the U.S. Bureau of Biological Survey, the forerunner of the U.S. Fish and Wildlife Service. It was a painful decision. On one hand, Darling did not want to "aid and abet" the new administration, much less forego a six-figure income to become an $8,000-a-year New Dealer. However, he had also seen waterfowl populations plummet as the prairie was engulfed in the Dust Bowl. The post offered a chance to make some real changes. Reluctantly, he accepted.

It is perhaps a tribute to FDR's foresightedness — or his political shrewdness — that he pulled Darling into his camp. Although Ding continued to lambast the president good naturedly, he poured himself into his new job with great enthusiasm. For many years, the Bureau had been a staid, do-nothing agency. It was about to get a face-lift.

Ding felt that one of the critical steps towards halting the drop in waterfowl populations — and other wildlife as well — was to set up a refuge system that would protect waterfowl nesting areas. He knew that many of these areas were marginal lands that had been farmed before the Dust Bowl, and were best left in their natural state. Consequently, his first step as chief of the Bureau was to develop a system of national wildlife rufuges.

This was easier said than done. Even in FDR's pro-conservation administration, the budget was stretched thin to meet urgent human needs — and the welfare of ducks rated a low priority. Darling did not get the money he needed to develop a good refuge system despite repeated reports and requests to the president, often humorously illustrated with drawings of homeless, "Okie" ducks that had also been "dusted out" of their homesteads.

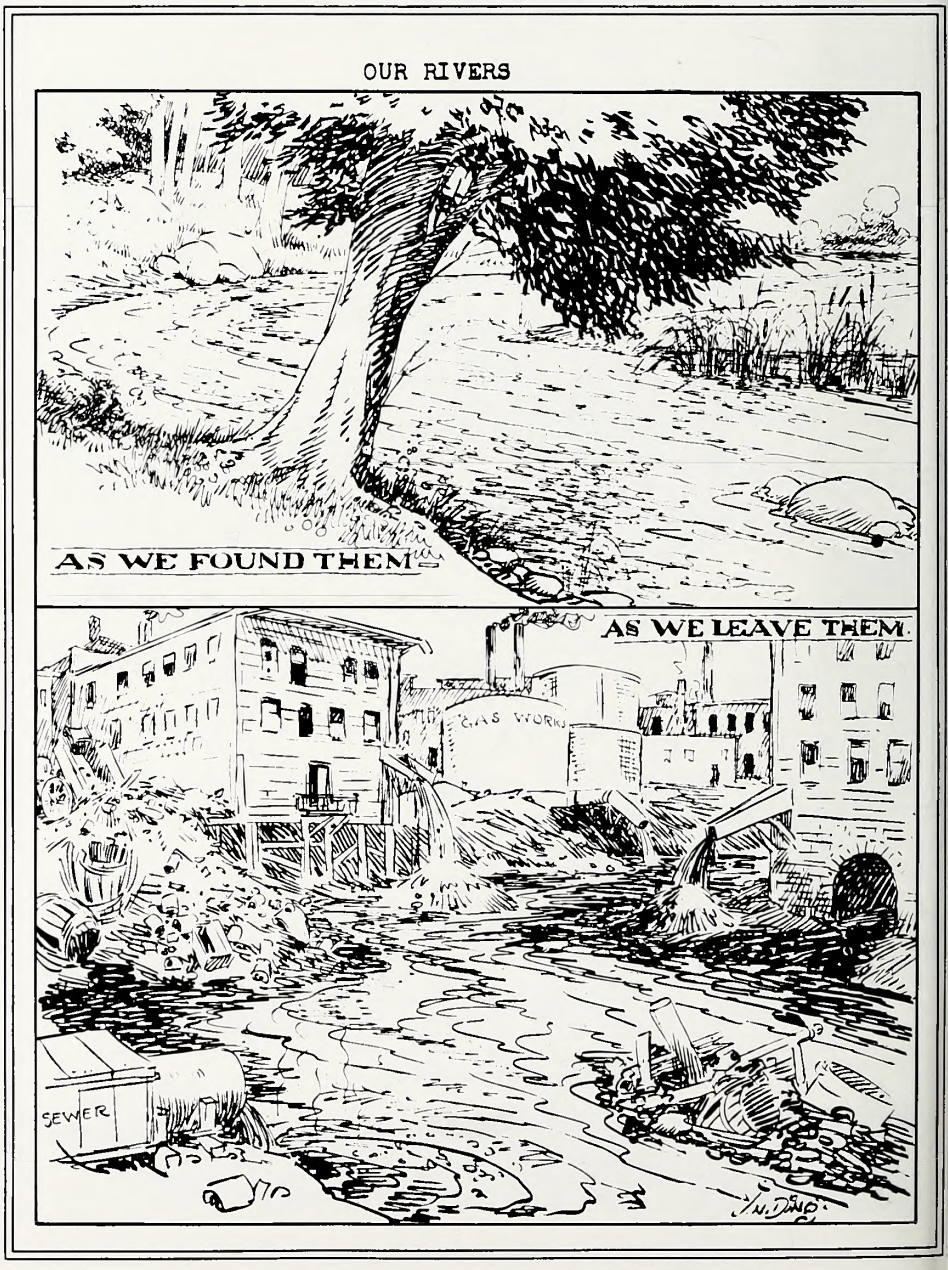
One measure that would help the refuge program immensely, however, was the passage of a mandatory, federal "duck stamp" for waterfowl hunters. The costs of running this program were considerable. Under normal circumstances, the proposed legislation, which included a $6 million appropriation, didn't have a chance.

At his wits end, Ding approached a good friend for help, Senator Peter Norbeck from South Dakota, who had a thick Scandanavian accent and loved to hunt ducks. Senator Norbeck agreed to introduce the bill — with the $6 million amendment. Taking the floor, he removed his false teeth and introduced the legislation with a rousing speech that was unintelligible to everyone. The bill passed unanimously. Assuming that the Senate would not have passed a duck stamp bill including the controversial $6 million appropriation, FDR signed the new bill without reading it. Later, he accused Ding of raiding the federal treasury, but he also made sure that the refuge program got its needed funding.

At the same time, Darling was pursuing another dream — uniting conservationists and sportsmen into a single camp. In 1935, he met with a group of leading industrialists and conservationists in a dinner meeting and laid the groundwork for a national wildlife conference, the development of an excise tax on shotgun shells to benefit wildlife which later became the Pittman-Robertson Fund (this is a 10 percent tax on the sale of all sporting arms and ammunition which is distributed to individual states), the establishment of cooperative wildlife research units at land-grant universities, and the founding of the National Wildlife Federation. All of these plans came to be.

After 20 months in his new job, Darling's relations with FDR had become strained. Ironically, the rock-ribbed Republican felt that the New Dealer had "sold-out" on many conservation issues, especially on huge water projects. Ding was an early, vocal and long-term critic of the U.S. Army Corps of Engineers in particular, and big reservoir projects in general. He saw little sense in controlling floods by allowing silt-laden water to run off the land and be trapped in silt-laden reservoirs. Instead, he felt that good soil conservation would control flooding, and result in clean, unfettered streams and rivers. Indeed, his first step when obtaining worn-out grazing lands for a wildlife refuge was to prohibit grazing of livestock and plant the land in a cover crop. His lush refuges were soon the envy of neighboring ranchers and farmers.

Consequently, Ding resigned his post, and returned to Iowa. During World War II, he continued cartooning and won his second Pulitzer prize. He was also deeply involved in local and national conservation issues. He fought to save several islands near his winter home in Florida from development, and these



Ding was fond of "before and after" cartoons, and this drawing which first appeared in the 1920s focused public attention on water pollution. Later, he became bitterly opposed to the large reservoir and channelization projects conducted by the Army Corps of Engineers and other federal agencies.

Ding's farewell cartoon — drawn while he was temporarily hospitalized — was premature. He published another half-dozen cartoons after he drew this one. The Des Moines Register published Ding's Farewell the morning after his death in February 1962.

If you'd like to learn more about Ding Darling, an excellent biography was recently published. *Ding — The Life of Jay Norwood Darling* by David Lendt is available from the Iowa State University Press, Ames, Iowa 50010. The cost of $11.95 includes mailing.

ultimately became national wildlife refuges. In cooperation with the League of Women Voters, he developed a short course in conservation for Iowa teachers. He also criticized the growing use of the pesticide DDT, saying that "some of the DDT projects scare me almost as much as the uncontrolled use of the atom bomb."

Following the War, he served as president of the National Wildlife Federation, but a rift soon developed, and he resigned from the organization. He was growing old, tired and sick. Despite poor health, heart attacks, and lung problems, he continued his fight for conservation throughout the 1950s. He opposed the Eisenhower administration's plans to flood the Dinosaur National Monument in Utah for a reservoir, stymied the Army's plan to turn the Wichita National Wildlife Refuge in Oklahoma into an artillery range, and bitterly opposed reservoir and channelization projects on the Missouri and Mississippi rivers. Near the end of his life, he also made peace with the National Wildlife Federation. In 1962, at the age of 86, he agreed to serve as co-chairman of National Wildlife Week, and died a month before it began.

Sportsmen often call Ding Darling "a duck's best friend." That scarcely does credit to the man, for he was so much more. Indeed, some of Ding's best cartoons portray the horrors of war. One in particular called the "Vintage of 1914" shows two hulking brutes — labeled the Axis and the Allies — twisting a wine press. Caught in the vat are the helpless men, women and children of Europe. The vintage, of course, is their blood and suffering. Following the "War to End all Wars" — and the war after that — he published repeated cartoons calling for the establishment of a league to outlaw war. Ding Darling also saw that conservation was a global cause and understood that without some sort of worldwide population controls, famine and strife were inevitable. To those who responded that America could feed the starving hordes, he wryly responded that "feeding all the grasshoppers in Kansas wouldn't solve the grasshopper problem — soon we'd just have a lot more grasshoppers." Ding Darling wasn't just the best friend a duck ever had — he was pretty good for people and their environment as well. ⟐

Two Days In John Green's Swamp

The Green Swamp is a 140-square mile haven for plants, wildlife, and a rapidly disappearing way of life.

by Lawrence S. Earley

Green Swamp alligator

Up Driving Creek

We had been pushing hard up Driving Creek, deep in Brunswick County's Green Swamp, when the canoe ran headup against a half-submerged log. It was a nice juniper log with the smooth cut of the saw visible at one end. It must have been snorkeling in the creek for the last 50 years or so, ever since the last of the big stands of juniper were logged out of this area.

It stopped us now on this warm March afternoon. There were three of us in the canoe — Manley Fuller and Sharon Grubbs, both of the National Wildlife Federation Wetlands Project, and myself. Our plan had been to push up Driving Creek to the source, a place known as "the soups." There were alligators there, we had heard. I wasn't as keen as Manley about this venture. Manley is used to alligators, having done his Master's research on the alligator population at Lake Ellis, and having "wet his feet," as he put it, on Costa Rican crocodiles last summer. Alligators make me nervous. So do water moccasins. The last thing any human being had said to us that afternoon was, "Now, watch out for moccasins. In this warm weather you're sure to run into them." That we had made it this far without one falling into the boat was an oversight which I felt sure would soon be corrected.

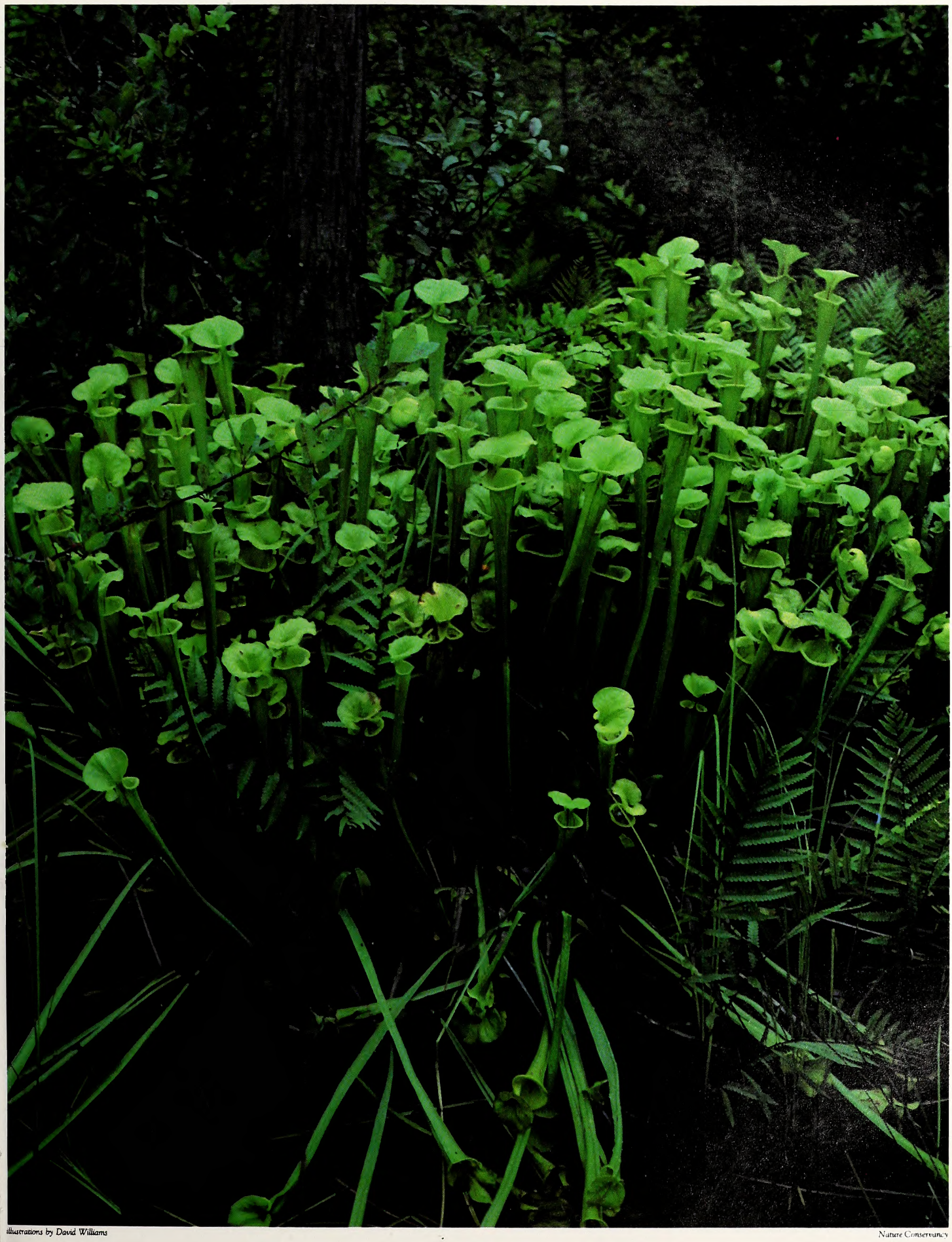
"Guess we'll have to turn back," I said hopefully. Manley was delicately toeing the obstacle. It was not budging and I was glad.

We were approximately 135 miles southeast of Raleigh, 25 miles southwest of Wilmington and five miles north of Supply. By our Green Swamp compass we were, as the crow flies, seven miles southeast of Big Curve, five miles southwest of Big Bay Ridge, and three miles south of Honey Island. We were also about 2 feet from a thorny tangle of bay forest, titi (pronounced "tie tie") and catbrier that had scratched our arms, snatched our hats, and punctured our good humors for the better part of an hour and a half. Above us a wrathful sky was boiling.

The swamp could use the rain, I thought. Two years before, on a broiling June day, I had seen the Green Swamp for the first time and frankly I was disappointed. I had expected something primeval and haunting, like the Okefenokee Swamp with its acres of standing water and cypress trees. What I saw was parched scrub land and pine plantations, more like desert than swamp. Nevertheless, the Green Swamp is considered one of the most valuable natural areas in North Carolina, with the best remaining examples in the Carolinas of pine savannahs, bay forests and pocosin. Long-time residents will tell you that it's one of the most game-rich areas in the state, with good populations of bear, bobcat, deer and raccoon. It's got every one of the 14 carnivorous plants found in the State, and it's also got some stands of the rare Atlantic white cedar, or juniper as it's commonly called. A lot of people treasure the Green Swamp, including the folks at the N.C. Nature Conservancy who have acquired 13,850 acres for a nature preserve.

And Manley Fuller who was stomping the juniper log with

American alligators haunt it and native white-tailed deer are still found there, but the Green Swamp also shelters great numbers of carnivorous plants, like the yellow pitcher plants (Sarracenia flava) *at right. All 14 of North Carolina's carnivorous plants are found there.*



illustrations by David Williams

abandon even as thunder sounded. Suddenly the log broke from its underwater snag and bobbed gently in the black water.

"All right!" cried Manley.

"What's our plan if it starts to lightning?" I piped.

"We'll make out. It's so thick in here the rain'll never get to us."

"But we're in an aluminum canoe!"

"Then we'll just get out of the canoe." And he shot me a glance that said as clearly as words, "You've got a very unhealthy imagination."

He grabbed a handful of sweet bay and yanked the canoe over the log. As we pushed forward, deeper into the Green Swamp, I listened to the thunder and then, on my right, through the tangled pocosin . . . did I conjure it up? . . . I seemed to see a writhing row of water moccasins, their cottony mouths gaping open like faces in a boys' choir.

An unhealthy imagination? Me?

John Green's Field

As a man of science, Ebenezer Emmons' imagination was nothing if not healthy and progressive. And yet in the 1850s, as the 19th century geologist studied the Green Swamp and other eastern North Carolina wetlands, it's likely that his idea of "swamp" was similar to the idea of "wilderness" that had been current ever since the first European settlements in America. Quaking at the edge of the great North American forest, 17th-century Massachusetts Puritans described the dark miles of woods as a "howling wilderness," a "hideous wilderness." In much the same way, people recoiled from swamps. "Dismal" swamps, they were called, and not only the one that retains that name today. Unproductive and useless, swamps were wastelands, the source of a deadly vapor which was thought to cause fever and death. It would be many years and a continent away before the mosquito was correctly identified as the cause of malaria.

Thus when Ebenezer Emmons saw the 140 square miles of Green Swamp, he cooly took note of its vast forests of cypress and gum, the Atlantic white cedar, the longleaf pines, and the beech, maple, ash and poplars. Without benefit of an aerial view, he correctly surmised the swamp's round shape. Although he didn't comment on it, he probably understood that part of the swamp was drained by the Waccamaw River, while the southern half sloped gently toward the Cape Fear River.

And having considered the forests and other vegetation, he imaginatively swept them off the map. The soil, he wrote in his report, was superb! "The soil was found to be much richer than I anticipated . . . The earthy matter is as fine as that of the Onslow or Hyde county lands . . . Hence the cost of drainage should be incurred, and these valuable lands reclaimed."

In place of the cypress-gum forests, he saw crops of corn. Cash-paying cotton or wheat grew where the longleaf pines waved in the summer breezes. The squatters who made baskets on the sandy islands in the interior of the swamp became industrious farmers, and floating over the scene was a pale blue haze of progressive 19th-century chimney smoke.

Such was Emmons' vision, and such was the vision of men several generations before him. For the forest that the geologist saw in the 1850s had remained essentially unchanged since 1795 when three tracts of land totalling over 170,000 acres of the 200,000-acre Green Swamp were deeded to three men for the scant total of $7,100. What Benjamin Rowell, William Collins and Stephen Williams had in mind with so much land is not known, but agriculture was then on the march up the Cape Fear River and no doubt this figured in the plans of these men.

N.C. Botanical Gardens

Though practically impenetrable much of the year, the Green Swamp was well-known to many travelers. It had been called "John Green's Field" at first, after an early settler, then "John Green's Swamp," "Green's Swamp," and finally "Green Swamp." Lake Waccamaw, on the northern border of the swamp was an especial favorite of travelers. In 1734 the botanist John Bartram visited the lake, "as I had heard so much about it." Pushing inland from a Cape Fear River plantation, he swatted "large musquetoes" as he crossed pine barrens and swamp to get to the lake, which he found "the pleasantest place that ever I saw in my life." When his son, William, visited in 1773, he, too, was impressed, finding "the situation delightful."

It was a point of view that the Indian inhabitants would have shared, for archaeological evidence shows that the land was continually inhabited for several thousand years. And why not? It was thick with bear and deer and wild turkey. John Bartram remarked on the tameness of the deer, which looked on him as if they had never seen another human being.

And it had good soil, according to Ebenezer Emmons. Drain it, he said, and we'd put this unproductive swamp to work.

Easier said than done. What kind of machinery then invented

Nature Conservancy

Thick pocosin chokes much of the Green Swamp, and even a fallen warbler nestling becomes prey for an argiope spider in the close underbrush. Here and there in the pine savannah islands, wildflowers like this meadow beauty bloom in spring, summer and fall, making a floral spectacular for the botanically minded. Botanists have found 50 different plants in a square meter of savannah.

could tackle 200,000 acres of swampland, much of it underwater? What kind of men would take on such a job with such evident dangers? In spite of little nips at its flanks, by the end of the 19th century the Green Swamp was just as massive and unsavory an obstacle to settlement and communication as it was at the century's beginning. The swampland forests that John Bartram had seen in 1734 and that Ebenezer Emmons had noted in 1860 were still pretty much intact.

Then in 1907 the Waccamaw Lumber Company lay siege to the Green Swamp. It railed in great steam skidders and it built a giant sawmill in Bolton. It laid 18 miles of rail between Bolton and Makatoka, and shorter spurs into the swamp off the main line. They might have called it the Floating Railroad. Workers cut 8- or 10-inch wide gum logs for crossties, and lay them close together over the wet ground. Waist-high in water and moccasins, gangs of loggers used two-man saws and axes to fell the giant cypress and gum. They skidded out the longleaf pines. They took the maples, the beech, the ash and the poplar. Flatcars hauled the wood to Bolton, and hauled the men to Makatoka at night where the logging camps were. For 34 years they cut virgin timber and when the Waccamaw Lumber Company sold 138,000 acres of the Green Swamp to Riegel Paper Corporation in the 1930s, the forest that Ebenezer Emmons had seen was gone.

By 1914 drainage operations had begun on the cutover land. In one district of 28,000 acres between Lake Waccamaw and Livingston Creek, 44 miles of canals were carved into the quaking soil. Dredgers, 30 feet long and 12 feet wide, driven by coal-fired steam boilers, dug deep into the swamplands. By the late 1930s much of the northern reaches of the swamp had been drained and were being farmed.

It had taken nearly 80 years, but Ebenezer Emmons' vision had finally been realized. The Green Swamp was nearly gone.

Pocosin and Savannah

Manley Fuller has been trying to get me wet for the better part of two days. Yesterday we had grappled with shrub-choked Driving Creek, pulling ourselves along with fistfuls of vegetation until the creek had finally surrendered to the bay shrubs. Earlier today we had waded through muck in order to get into Layman's Pond, a sink hole in the southern portion of the Green Swamp. I had returned to the car for my hip boots, obeying my undying conviction that there's no need to get your feet wet unless you can't help it. Of course by the time I returned and waded out to the pretty little cypress pond there were Manley and Sharon in the crook of a cypress tree, wet to their waists and smiling a little too smugly for my taste.

And now, mid-afternoon, with the storm clouds banished by a hot sun, we are about to push off into the pine savannahs — the most fascinating part of the Green Swamp tract that the Nature Conservancy owns. Separating Big Island Savannah, Shoestring Island Savannah and Bean Patch Island Savannah are long fingers of low-lying pocosin, and the rain has made them knee-deep in spots. My hip boots are back in the car again. And Manley is standing by the trail, with that familiar smile on his face. "Well,"he is saying in his North Carolina drawl, "we're going to get wet."

I give him a wink. "You're a hard man," I say, and Manley turns and leads the way.

On aerial maps, the 13,850-acre tract acquired by the Nature

Logging Crew, 1913

Scattered longleaf pines grow atop the sandy savannah islands throughout the Green Swamp. Frequent fires maintain the open understory of the savannahs, allowing perennial flowers to flourish. In the early 20th century, teams of loggers lay siege to the green swamp, cutting the hardwood species and the rich swamp forests of cypress and gum. Settlers once tapped the plentiful pine trees for turpentine, and much of it was carted to the Waccamaw River and shipped to Georgetown, South Carolina.

N.C. Botanical Garden

Conservancy shows up as a broad swath of vegetation. Strikingly absent from this part are the parallel silver scratches that strike east and west on the swamplands to the north — drainage canals. The Nature Conservancy's land, which we are entering here, is practically unaltered, although canals to the north, fire lanes and Route 211 have changed some of the original drainage patterns. This intact micro-version of the original Green Swamp features three major kinds of plant communities — bay forest, pocosin, and savannah. We ran into the bay forest yesterday as we tested Driving Creek. The pocosin that we're slogging through now consists of thickly growing evergreen shrubs overlying peaty soil. But the savannahs are the most interesting of the plant communities in the Green Swamp, and they are rapidly disappearing from the southeastern landscape. They crop up in the swamp as islands, sandy ridges that drain slowly.

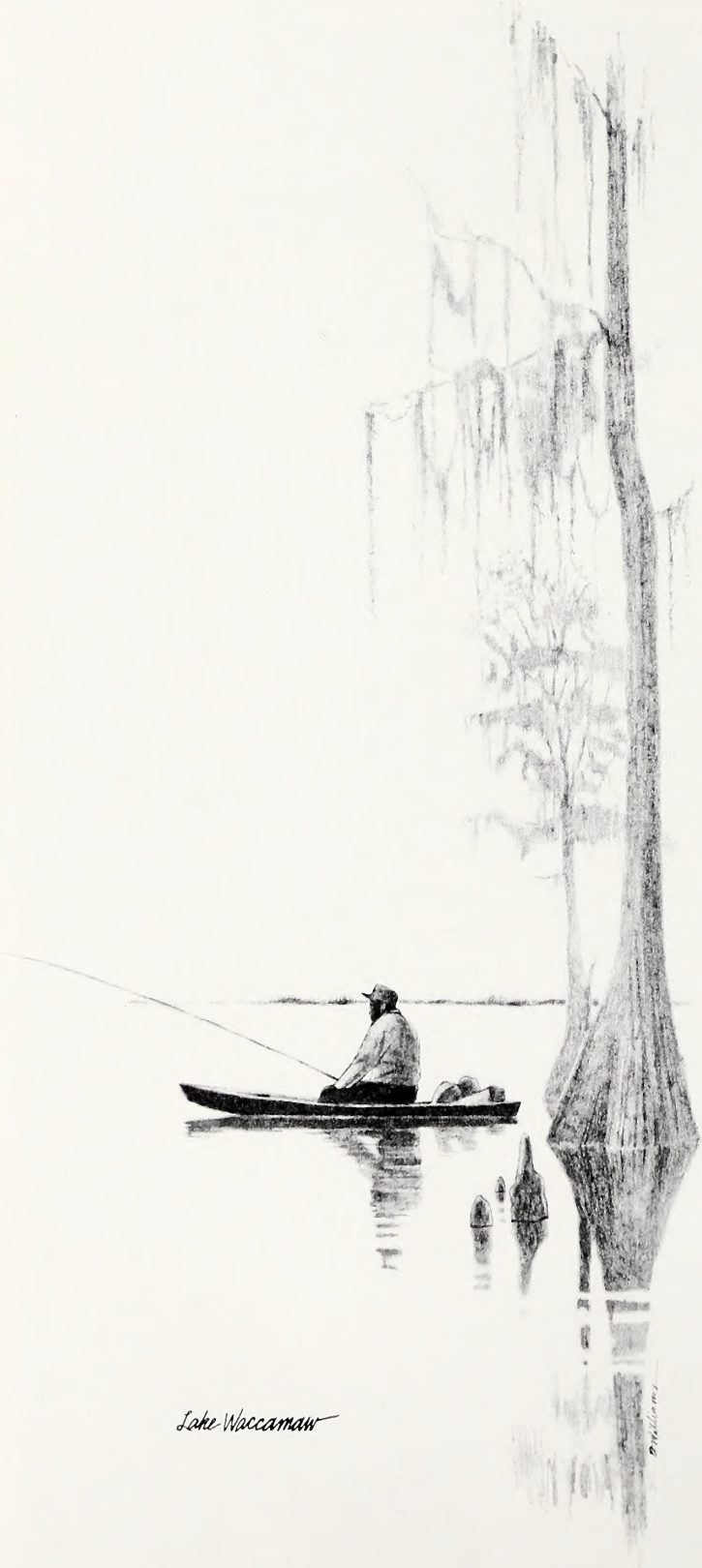
As we break out of the pocosin, my boots streaming and my toes squirting water inside, I take a good look at Big Island Savannah. It's a broad, open area with irregularly spaced longleaf pines thrusting up into the sky. A recent fire has swept the understory clear of everything but innumerable clumps of spring-green wiregrass a few inches above the blackened soil. There are scorched pine stumps about 6 feet high across the broad savannah. Longleaf pine seedlings have bronzed needles. In another two months the floor will be covered with flowers. But now, in early March, the savannahs are merely bright and airy and open, and I can understand why they were once used as pastures.

Although the savannahs have been studied carefully, there is a lot still to be learned about how they work and why certain kinds of things grow there. Elevation and hydroperiod, or the amount of time the vegetation spends in water, have something to do with it. We take a dogleg to the left and angle south where the savannah is being swallowed up by thick pocosin underbrush. Our feet swish through thick golden whorls of unburnt wiregrass.

It's hard to tell, but the burned savannah we have been walking on is a ridge. From just about any angle, the savannah looks uniformly flat all around, but there is a slight elevation toward the middle — about one foot's worth — and that seems to make all the diference. At that "lofty" height longleaf pine grows. It will grow there because the savannah is wet in winter and dry in summer, and the longleaf can withstand both extremes. But now as we move toward the edge of the savannah, the vegetation changes. We pass through toothache grass, broomsedge with its wedge-shaped seed tufts. "Look what's happening," observes Manley ahead of me in the afternoon's orange light. "The ground is getting wetter. The longleaf is giving way to pond pines. There's titi, and fetterbush, too — typical pocosin vegetation." Not 25 paces from the higher and drier savannah we're in a wetland.

We begin to find relatively strange adaptations to the wet conditions. "Look — pitcher plants," says Manley. "*Sarracenia flava.*" We have to bend down to see the dried stalks of last summer's pitchers, their tubular leaves still standing straight. These carnivorous plants are thought to have adapted to the nutrient-poor soil by taking nutrients from the bodies of insects which are lured inside their pitchers. There are all kinds of carnivorous plants along the wetter portions of savannahs. All four species of pitcher plant are found in these locations, and some hybrids. So are abundant numbers of Venus's flytraps, two kinds of sundews, two butterworts, and five species of bladderwort — all 14 carnivorous plant species found in southeastern North Carolina.

The peculiar combination of soil and hydroperiod also produces an extraordinary diversity of other flowering plants. In



Lake Waccamaw

summer the savannahs bloom with grass pinks, rose pogonias, rosebud orchid, white-fringed and yellow-fringed orchids. There are milkworts, meadow-beauties, sabatias, snakeroots, trilesas and goldenrods. Botanists have found over 50 plants in one square meter of savannah, an astonishing figure!

We're now mucking through the lowest point of the pocosin barrier between the savannahs. "You can see why they call these savannahs islands," Manley says as we break out of the pocosin and into the open pastureland once more. "This is Shoestring Island. Across from us there's another pocosin, then it opens up once more to another savannah, Bean Patch Island. Savannah, pocosin, savannah, pocosin — all because of elevation and soil."

And fire. The key to the savannahs is fire. Regular fires keep the understory low and maintain the open, airy effect. Without fires the woody shrubs like dangleberry, and wax-myrtle, and bitter gallberry would muscle in and take over. The orchids and wildflowers would lose light and disappear. The savannah would turn into a forest dominated by longleaf pines and evergreen shrubs. A woody shrub has no defense against a fire, but wildflowers keep their stems underground and thus they can survive a fire. The pond pine releases its seed only after a fire scorches it, apparently nature's way of ensuring that the seed is dropped into a fertile ash bed with little competition rather than into water where it might not germinate. The seedling of a longleaf pine keeps its bud armored within a thick coat of needles. Fires are essential to the botanical diversity of the savannahs.

We pass several pines that were once used for turpentining. One hundred years ago we might have seen large barrels sitting amidst the wire grass. From May through September, men would gouge V-shaped streaks into the wood. The raw sap would flow down these streaks and into a "box," or a small hollow cut into the wood below. Several times a season the sap would be dipped into the barrels and carted off. We stop by one of the old trees and notice that the deep scar is nearly closed. "Here's a turpentine tree that's about ready to close up," Manley says. "It's good to know they can heal themselves." We see several mounds in this savannah, evidence of the tar kilns that once were constructed here.

The trail to Bean Patch Island slithers through 100 yards of knee-deep muck. I know Manley is enjoying himself. He's far ahead of us. I try to keep pace with Sharon, although I'm extra cautious with cameras strung around my neck.

When we finally emerge Manley is holding out a tiny snake for our inspection. "I found it under the bark of that dead pine," he says, nodding to a fallen log not far away. A baby ring neck snake. "Bark is a real good place to find snakes. Look at the nice yellow belly on this snake!" We push our way through high wire grass. Manley finds a Carolina anole in a tree and spies a gaunt cypress on the far side of the savannah. "Look at that big sucker over there!"

The Green Swamp is rich in wildlife. The longleaf pines in the savannahs provide good nesting sites for the endangered red cockaded woodpeckers. While you're looking for its nest holes you might hear the rattle of a canebrake rattlesnake; the wire grass is good habitat for this reptile. Some of the last of North Carolina's native white-tailed deer are found in the Green Swamp. Most were killed out of the State near the turn of the century and northern deer were brought in to boost the dwindling native populations. You might find one with a southern drawl here. Perhaps that's what we saw earlier today, dead in a ditch by the side of Route 211. Nearly 50 black vultures were sitting in a pine tree nearby, and they flew heavily into the air when we approached. Cautious field workers have avoided making claims

that the American alligator is found in the Green Swamp, although they are fairly sure it is. Manley, Sharon and I know at least two alligators who live in the swamp because we saw them in a drainage ditch north of Driving Creek.

"Here's the trail," Manley is saying.

"Bear? Where is it?" asks Sharon, lagging behind a little and not hearing. She is disappointed when Manley repeats his original statement. "I was hoping we'd see a bear," she says.

The mention of bear reminds me of my conversation with Joe Hufham of Delco not long before. Hufham is a long-time resident of the Green Swamp area and an energetic chronicler of its folk history. In articles for the Whiteville News-Reporter and in several books, he's shared stories from a lifetime of logging, trapping and hunting in the swamp. He told me a story about the time he met a 350-pound bear in the Green Swamp.

"This happened when I was teaching school. I was walking the railroad track out there near Big Ridge, and it was raining. I had on my suitclothes, thick underwear, and a big overcoat, and everything was soaking wet. I was tired. And all of a sudden I heard something whistle. I sort of turned my head back. Not a thing coming.

"It was raining hard. The drops looked like sheets of sleet dropping. I turned my head back and exactly the length of one rail ahead of me stood a 350-pound bear. I knew I couldn't outrun him because a bear can outrun a dog, for a short distance anyway. And something came to me: just stand still. So I stood there. And the bear challenged me. He had his hind feet and his front feet on the rail and he was shaking his head. My heart was beating so hard I could hear it. He finally got tired of looking at me — he must have looked straight at me for three minutes — and he went on across.

"As tired as I was I didn't want that bear to catch me unarmed again. So I picked up a log that was as big as a crosstie. I picked it up and put it over my shoulder. And I carried that thing to Big Ridge, about 300 yards, I reckon, before I threw it down. My idea of that was to look bigger, but if he actually come up to me, to throw it on him."

Hufham has had other close calls in the swamp, one time with a cougar. Of course there's no proof that the native species of cougar still exists in the swamp, but like other places in North Carolina cougar sightings are still reported in the Green Swamp. "I heard it said that prior to the coming of the skidders and the locomotives there was many panthers in there killing up many deer in Columbus and Brunswick counties. The logging companies paid such a big bounty they killed them all out. Panthers and wolves."

Wolves? "Now I did know a very old woman — and she's been dead years and years — and she said that they used to hear wolves howling at night."

Hufham remembers stories about Confederate deserters hiding out in the swamp. "There was a camp of them out there in the woods," he said. "They were called 'Scalawags,' and some called them 'Buffaloes.' They had got hold of some federal uniforms — I reckon they got 'em off of some dead soldiers. And whenever Sherman was coming through here they disguised themselves as federal soldiers. And when Sherman was pillaging and burning, these fellers would ride out, you know, and get all the valuables and stuff just like Sherman's crowd, and they'd go back to the Green Swamp."

The Green Swamp is rich in stories like that. Stories of smart bears and alligators that hunt raccoons from the bottom of pits, like sanddoodles.

But on this unseasonably warm March afternoon, with the warm light of sunset staining the pocosin toward the west, we do not see any black bears or Confederate ghosts. The snakes are still lethargic and the tough men who worked up to their waists in Green Swamp muck are long gone. We are three visitors from Raleigh making our acquaintances with a distinguished bit of North Carolina landscape. Manley is ecstatic as we head back the way we came. "Tell you what," he says, "whenever I feel bad I just oughta come down to the Green Swamp. I just can't get enough of this place!"

The Future of the Green Swamp

In 1974, the Department of the Interior designated a 24,800-acre portion of the Green Swamp as a National Natural Landmark. Three years later, the Federal Paper Board Corporation, which had acquired much of the swamp from Riegel Paper Corporation, donated 13,850 acres of the Landmark property to the N.C. Nature Conservancy "to be held in perpetuity for the people of North Carolina." It was, as Bill DeBuys, director of the N.C. Nature Conservancy, says, "an enormous act of corporate generosity, one of the largest gifts to the Conservancy of any corporation." In a 1980 report on the Green Swamp's significance, the Department of the Interior wrote: "The Green Swamp has national significance and international interest. It offers the nation's most amazing display of carnivorous plant life, and is a botanical resource extremely valuable for worldwide observation and research."

Though the land is protected by the Nature Conservancy, there are threats to its integrity. There is a possibility that draining operations on adjacent property could lower the water table in the area, and change the vegetation patterns. Peat mining in these lands could do the same. The theft of carnivorous plants from the savannahs is a continuing problem.

The Nature Conservancy is making the Green Swamp accessible to the public. Already in place is a boardwalk into some of the interior savannahs. Guided tours are offered several times a year, and a brochure for a self-guided tour is in the works. The Wildlife Resources Commission is leasing some land for its Green Swamp Game Land.

Dr. Tom Perry, the chairman of the Conservancy's Green Swamp Stewardship Committee, says, "We want traditional uses of the Green Swamp, including hunting. Ultimately we'll have visitor trails through the swamp. We want people to visit and use the area. It's a beautiful place, with the flowers blooming."

But is there a chance that the Green Swamp, with all its fragile relationships of water drainage and plant communities, can be loved to death by visitors? Bill DeBuys is worried about this. "We're always concerned with too much human use of a fragile area, and so we're concerned about the Green Swamp. Traditionally, there's been a lot of plant poaching and this might increase with greater public access."

The Green Swamp has been through too much already to be abused further. The portion that's left is a haunting remnant of one of North Carolina's most forbidding wildernesses. It's likely that old Ebenezer Emmons, were he to return, would still be despairing of all that unproductive land; but a traveler and botanist like William Bartram, taking another trip through the Green Swamp after an absence of two centuries, and observing the native whitetail deer, the bald eagles, the airy and pleasant savannahs — he'd probably feel right at home.

For more information about guided tours to the Green Swamp, write the N.C. Nature Conservancy, Box 805, Chapel Hill, N.C. 27514, or call (919) 967-7007.

Digging A Canoe

Down at Crusoe Island in the Green Swamp, they still dig canoes.

by Lawrence Musselwhite

Ken Taylor

Cross-legged in his Crusoe Island dugout canoe, Tommy Spivey slides through cypress-crowded section of Green Swamp. Built low and narrow, after old Indian models, the canoe is designed to maneuver the twisty swamp channels of the region. Though easily overturned, the canoe can transport a burden as heavy as a deer.

It was an early spring morning in 1952, and I was drifting and paddling down the Waccamaw River in an 11-foot Lumber River boat. I was a wildlife enforcement officer in District 4 at the time, and patrolling this stretch of river was a pleasant part of my duty. The river was high from heavy rains, and the sun was bright on the water.

As I rounded a bend in the river I saw my first Crusoe Island dugout canoe. Up ahead a man in a small canoe was paddling with a one-handed cypress paddle. His boat was about 8 feet long and barely 20 inches wide. The boat was so small, and yet moved so swiftly, that I tried to catch up to him to ask him some questions. But the harder I paddled the farther behind I seemed to get. Finally he reached the cypress trees and disappeared into the swamp.

For the next few nights I lay in bed and recalled the sight of this little canoe slipping away through the cypress swamp, with only about 2 inches of freeboard and leaving no sign of its passage except for a tiny row of bubbles. I grew curious about that canoe and how it was made, curious, too, about the people of Crusoe who for generations have made that traditional boat.

Three miles square, Crusoe Island is a bit of high ridge surrounded on three sides by the Waccamaw River. On its eastern flank is the Green Swamp. Crusoe was settled as early as the 18th century, for land deeds in 1800 refer to a "Croossous" Island. Before taking on its current spelling, the Island was also written as "Cruso," "Crewsoes," and "Cruosoes." The original Crusoe is a mystery, although some say that outsiders named it after the fictional character Robinson Crusoe who was shipwrecked on a remote island.

For nearly 200 years people have lived on the island farming, fishing, hunting and trapping. Surrounded by river and swamp, it's little wonder that islanders took to the water and created boats that could slip silently through the brushy creeks and between the cypress trees.

I grew more familiar with the sight and performance of these dugout canoes over the years, but I still had a hankering to have one of these small boats for my own. Then one day last spring I went to see an old friend on Crusoe, Ethermun Spivey, and his son Tommy. Both of them live on the banks of the Waccamaw. "I'd like you to dig a canoe for me," I said to them. "Bring us a nice piece of cypress, and you're in business," Ethermun shot back.

Finding a "nice piece of cypress" is easier said than done. In years past canoe makers would go out into the Green Swamp looking for an old, straight-grained cypress log that had been cut in the logging days earlier in the century. Some cypress could still be found buried in the muck or hidden away in

Ken Taylor

Split down the middle, the massive cypress log will provide the raw materials for two dugout canoes. Islanders say that black cypress will make a better canoe than white cypress because it won't rot when wet or dry. They favor cypress logs that have lain in water for 50 or 60 years.

some remote corner of the swamp, relics of logging expeditions of long ago. Nowadays cypress logs are harder to find in the swamp. Luckily I had another source, and I brought the log to Ethermun Spivey's house.

For a small dugout a log should be about 10 or 11 feet long and 20 inches in diameter. The first step in building my dugout was to split the log down the middle. We used a saw, an axe and six wedges. With a lot of luck we split the cypress log right down the middle. I say "luck," because if you split the log straight you can make two dugouts out of one log. On the flat side of each log Ethermun drew the rough shape of the dugout. Then with a sharp axe he hacked out the dugout shape and still using the axe, he rounded the sides and flattened the bottom of the boat.

At this point Ethermun still hadn't "dug" the canoe, but he was about to. We turned the flat side up and using a guideline drawn about 1 inch from the boat's outer edge, the Spiveys started their digging. Using a long-handled adz, they carefully removed the excess wood in the interior of the boat. Then they switched to a short-handled hollowing tool, or a "howl," to reach the basic shape of the dugout canoe.

So far so good. But to get the right thickness for the sides and bottom of the boat is difficult and takes skill. To do this Ethermun first took a tape measure and drew a line from side to side at a point one third of the way from each end. Measuring the exact middle of the canoe, he drew a third line. He marked a point in the middle of each line and at the spots where the boat's sides began to curve. He used a 1/2-inch augur and drilled a hole at each of these nine points. He cut nine cypress pegs about 1 inch long and drove them deep into these holes. Again using the "howl," he cut away the rest of the wood until he reached the bottom of the pegs.

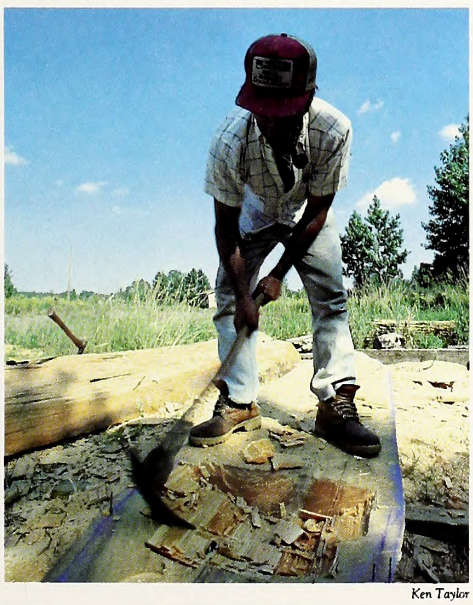
Now he did the finishing work inside and out, and shaped up the bow and stern. With two pieces of heart-of-cypress boards he finished the bow and stern caps. He sanded the wood and finished it with a wood preserver to keep it from cracking. The finished product was as nifty a piece of work as any boat I've owned.

A Crusoe Island dugout canoe rides deep in the water and it is easily overturned and very heavy. But a skillful canoeist can carry a deer in the dugout. The shape of the bottom is critical, because if it is too round the boat will tend to turn over.

I know of only about four people in North Carolina that still dig these canoes. Indeed, digging a Crusoe Island canoe has been a skill handed down from generation to generation, but it is rapidly becoming a lost art.

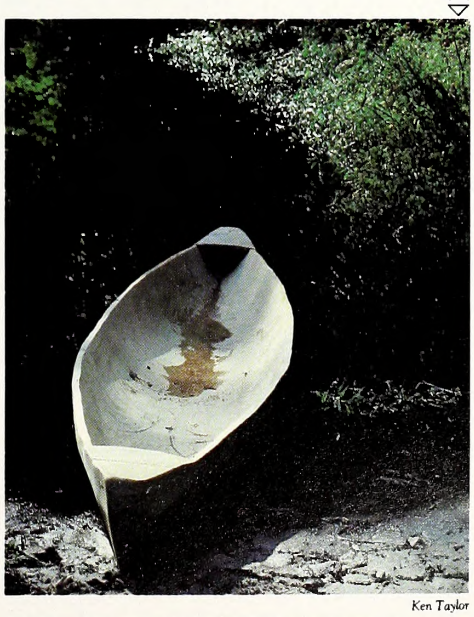
Ken Taylor

The Spiveys use axes to hack out a canoe shape from half a cypress log. Then Ethermun Spivey uses a "howl," or a hollowing tool, to flatten the bottom of his canoe. Canoe is still only in its rough form.



Ken Taylor

Dig it! After turning the boat hull down, Tommy Spivey uses a long-handled adz to cut out the interior, and then boat diggers switch to "howl" to hollow the boat to the right thickness.



Ken Taylor

When boat is hollowed out, bow and stern caps are fitted. The wood is sanded and finished with a wood preserver. Finished boat will last for years and a short cypress paddle is all the owner needs to guide him through swamps.

Leonard Lee Rue, III

The Hawk That Fishes

Many ospreys survived the DDT poisoning that wiped out our native eagle population.

by Curtis Wooten

The large bird caught my eye as soon as I stepped onto the spit of gravel that thrust into the river. It hovered momentarily, searching the water below before swooping to snatch a fish from just below the surface. With the fish in its talons, it rose laboriously, shaking water from its belly and leg plumage, to a dead snag atop a hemlock tree at the river's edge, where it lighted and fed. Though I had never seen one before, its long narrow wings, its dark on white coloration and its fishing habits told me it was an osprey.

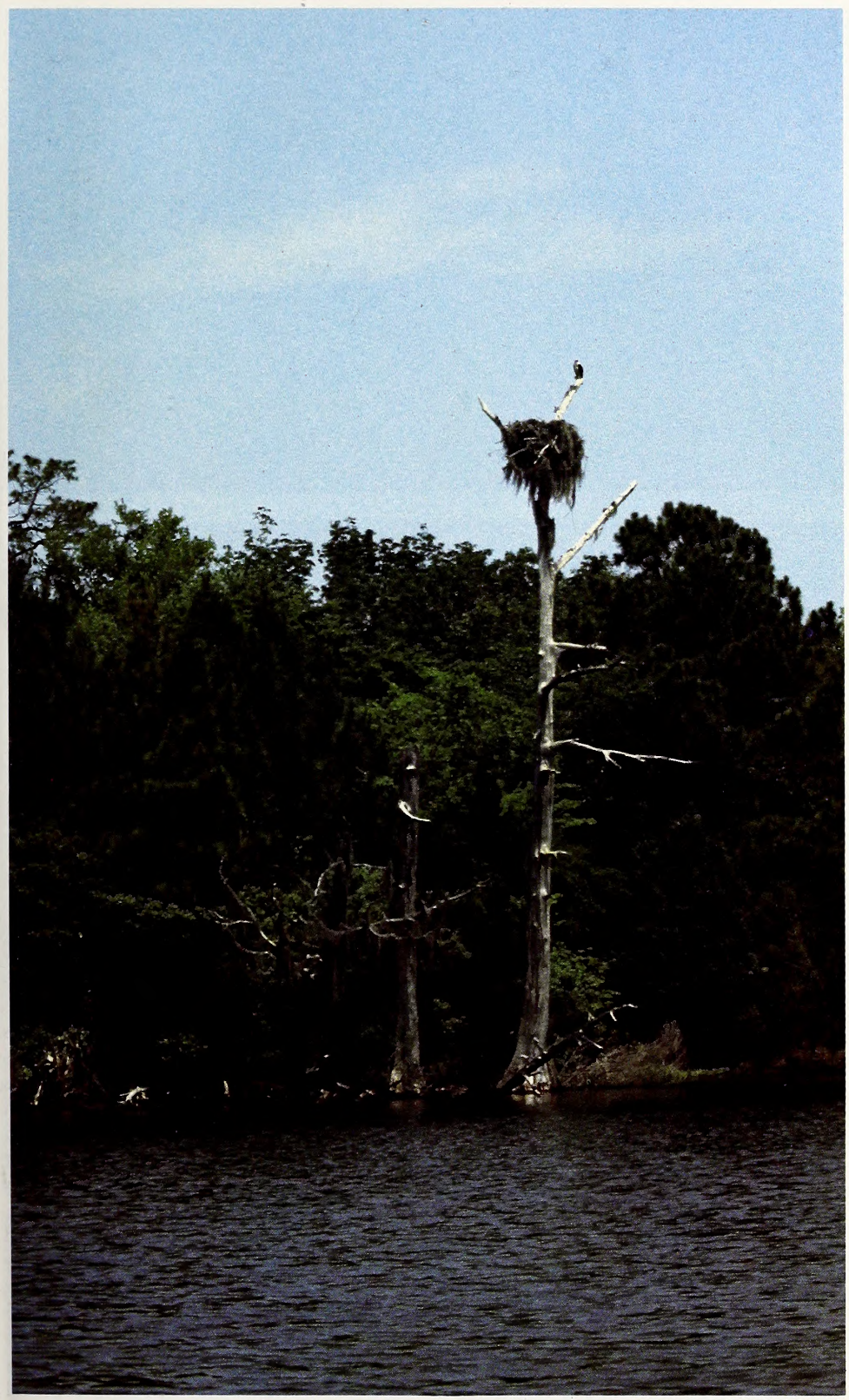
The year was 1973, a time when osprey numbers in the United States were low. But then again, the 20th century has never been kind to the osprey. Their decline began as early as the late 1800s, when logging operations felled nesting trees and losses to the gun were high. But the downward trend steepened in the 1950s and 1960s. The reason was DDT.

DDT — a chlorinated hydrocarbon pesticide effective in controlling many kinds of insect pests — was developed in the early 1940s. By 1947 it was in widespread agricultural use across the nation, but its impact wasn't to be realized until a decade later. DDT and its close relatives dieldrin, heptachlor, endrin and chlordane are persistent pesticides — that is, they do not break down with age and exposure to the elements, but linger in the soil and are washed into streams by heavy rains. In the '50s, trace amounts were consumed by small fish and other aquatic life and concentrated in their tissue. In the natural scheme, the small fish are eaten by larger fish and they in turn by still larger fish, with the pesticide concentrations increasing at each step. Finally, the birds of prey, the osprey, the eagle, the pelican and others, ate the fish and received a high enough dosage of the pesticides to alter their metabolism.

Particularly affected was their reproductive system. The results were delayed breeding or complete failure to lay eggs; thinning of egg shell which led to breakage during incubation; failure to produce a second clutch of eggs on the first; and high embryonic and fledgling deaths. Few young hatched or reached adulthood and the osprey population plummeted in many areas. In Rhode Island, for example, their numbers dropped by 50 percent between 1954 and 1961 and fell another 50 percent between 1961 and 1962. Osprey breeding pairs on the Connecticut shore of Long Island Sound numbered nearly 200 in the early 1940s, but only 24 in 1963.

DDT was banned from agricultural uses in 1973, and osprey populations in North Carolina have rebounded. There are twice as many osprey at Lake Mattamuskeet today as there were 10 years ago, with similar increases in other areas.

The trend is good news for fans of this superb bird of prey, for among raptors it is unique. Sharp spines on the lower surfaces of its feet and a reversible outer toe aid it in securing its grip on slippery fish. Different, too, is its distinctive plumage. The adult has dark brown upper parts and wing coverts and broad streaks on the sides of its head. White plumage covers the crown, neck and belly, and the crown and breast are splotched with brown, especially on the female. It is a medium-large hawk, having a 5 foot wingspan and weighing around 3½ pounds when grown. Because it frequents the same habitat and is similar in size and habits, it is sometimes mistaken for a bald eagle when observed at a distance. At a closer distance the osprey's white belly and dark wrist patches at the joint of its wing differentiate the two. Also, in contrast to other hawks and eagles, its wings are very long and narrow, and appear bowed or angled in flight. All other raptors fly with straight wings.



Tim Hergenrader

Although ospreys were already declining as a result of logging, the widespread use of DDT and other persistent pesticides beginning in the early 1940s had disastrous effects on the reproductive success of many wildlife species, and especially birds of prey. Eagles were extirpated in North Carolina, and osprey populations plummeted in all but a few remote places.

Osprey are widely distributed in North America but are always found near water. Birds that nest in the northern portion of their range are migratory, wintering in the Gulf states, Cuba, the Dominican Republic, Puerto Rico and Central America. Some individuals winter as far south as Chile, Paraguay, Argentina and the Galapagos Islands.

In North Carolina nesting populations are distributed all along the coast. They are frequently seen along the Intracoastal Waterway and on our sound shores and there are concentrations at Lake Mattamuskeet, Lake Ellis, Camp Lejeune and Orton Pond. Each of these areas has in recent years had 40 to 50 or more nests. Though few, if any, nest in inland areas, it is not uncommon to sight osprey near bodies of water anywhere in the State in September-October. Migrating birds frequently linger for a week or longer at inland lakes as they make their way slowly south in the fall.

Osprey tend to use the same nest year after year and some studies indicate that mates, once selected, stay together from year to year, but that isn't conclusive. John Hagan, a PhD candidate at N.C. State University doing research on osprey at Lake Ellis, says he banded a male and female at a nest on the East side of the lake in early March of this year. A week later he caught the same male with a different female at a nest on the opposite side of the lake. "There's a lot of shuffling going on out there," he said "and we don't know at this point what it all means."

Birds that nest on the Carolina coast begin arriving there from their Caribbean wintering grounds generally in the first week of March and continue arriving for the next three to four weeks. They return to their old nest, re-establish bonds with their mate or find a new one, and begin nest construction or reconstruction.

Osprey nesting sites are more varied than many raptors. They prefer a tall dead snag, surrounded by water, with a broken tip or side limbs to support the nest. In the absence of preferred nesting snags osprey will use tall stumps, pilings, buoys, and the like. Much to the chagrin of the U.S. Coast Guard, they regularly build on Intracoastal Waterway channel markers. And, if a good food supply is available, they will move as far as a mile inland for a suitable nest tree. Charles Peterson, the wildlife technician at Camp Lejeune Marine Corps Base, says birds there often nest in the tops of dead pines in clearcut areas close to water.

A shortage of suitable nesting sites can limit osprey numbers. In the early 1970s Chesapeake Bay osprey, unable to locate anything better, nested on washed up crab pots. Artificial nesting platforms erected on National Wildlife Refuges in the area received nearly 100 percent utilization the following year.

Nests generally are constructed of large sticks and lined with grass, bark and just about anything else the birds can pick up.

At Mattamuskeet, which is surrounded by farmland, corn stalks are a commonly used building material and toy boats, rag dolls, old boots, door mats, bleached bones and other unconventional items are used.

Eggs, usually two or three, are laid in late April and early May and the 28-day incubation period begins when the first egg is laid. This practice yields chicks with staggered ages, and though there is only a few days difference between the oldest and the youngest, the older bird may be twice the size of its siblings during the first few weeks. If food is in short supply the older, larger bird may dominate, preventing its siblings from eating and forcing their starvation. Nature can be cruel, but in difficult times the practice increases the odds that at least one of the young will survive.

Ed Jenkins

The female remains at the nest constantly for the first 30 days, protecting her young from wind, rain and intense sunlight. After that, brooding depends on weather conditions.

A considerable number of young osprey die before they make their first flight. Predation and disease take some birds and disturbance by man accounts for other losses, but weather is thought to be the biggest culprit. "Weather, in my mind, is the biggest factor in pre-fledging mortality here," says Ray Whittemore, the Assistant Refuge Manager at Mattamuskeet National Wildlife Refuge. "The spring of 1981 was extremely stormy, and although we had about the same number of active nests as in recent years, around 50, we only fledged 29 birds. On our surveys we found nests blown down, eggs off to the side and young birds blown from the nest. Last year, 1982, was much calmer, not much wind and few storms, and with essentially the same number of nests we fledged 59 young."

The young birds begin exercising their wings at five to six weeks but generally stay in the nest until they are around eight weeks old. In late June or early July, earlier or later depending on the number of young and the amount of food the parents have been able to provide, the young birds make their maiden flight. They return to the nest for the first week to roost and the parents continue to offer food occasionally for a couple of weeks. They continue to associate with the parents and the nest for another two months, but by the end of summer they are completely on their own.

Early migrants start south in mid-to-late September and are followed by others through October. The migration is slow and they generally arrive on their wintering grounds in December. Most immature birds remain there until their third year but a few

Jack Dermid

Leonard Lee Rue, III

Jack Dermid

Two areas which escaped serious pesticide infestation in North Carolina were Lake Ellis and Orton Pond, and osprey breeding success was virtually unaffected there. Even so, with populations again on the rise, severe weather, predation and disturbance by man can limit the number of fledglings which survive long enough to make their first flight.

return as two year olds.

Osprey get no help from their parents in learning to catch fish — it's an instinctive skill that is honed with practice. When hunting, an osprey flies over the water at heights ranging from 45 to 90 feet. When it sights a fish it either hovers momentarily, legs trailing, or swoops to its prey from flight. They usually select a fish swimming just beneath the surface of the water, but occasionally enter the water completely, their wings extended above and behind. They are the only raptors that enter the water after their prey feet first. They resume flight, shaking the water from their plumage, and return to their perch or nest invariably carrying the fish head first.

Osprey are capable hunters. Studies have shown that they catch the fish they go after nearly 90 percent of the time and are capable of catching two fish on a single dive. They are also opportunists, taking bullhead, catfish, bass, bluegill, pumpkinseed, eels, gar and shad at Mattamuskeet, and they may travel considerable distances to fish. Don Harke, the U.S. Fish and Wildlife Service's supervising biologist for North Carolina, has banded osprey at Lake Ellis since 1973. He says he has found the remains of salt water species in their nests there. Bogue Sound, the closest source of salt-water fish, is a good 10 miles away! Apparently they like a little variety.

Osprey have traditionally nested only in the coastal region of North Carolina, with good reason. Prior to the construction of the inland lakes and power reservoirs there was little suitable habitat for them inland. But the construction of reservoirs like Kerr, Gaston, Falls of the Neuse and B. Everett Jordan; High Rock, Badin and Tillery; Wylie, Norman, Hickory and James; and Fontana, Hiwassee, Santeetlah and Chatuge has changed that. There have been unconfirmed reports of nests on several islands in lakes in recent years and young birds are being "hacked" in an effort to extend their nesting range in North Carolina. Last year Dr. Richard Brown, Director of the Carolina Raptor Rehabilitation and Research Center at UNC-Charlotte, obtained six young osprey from Lake Mattamuskeet and "hacked" them on Lake Wylie and Mountain Island Lake. The project will expand to include Lake Norman this year and continue for another four to five years.

With their numbers on the rebound and efforts underway to expand their range into new areas, the future looks much brighter for osprey in North Carolina. Their population has doubled in many areas of our State in the past 10 years, but they aren't out of the woods yet. DDT and related pesticides, banned from use in the United States in 1972 and intervening years, are still in widespread use in Central and South America where the birds winter — and other chemicals threaten. Polychlorinated biphenyls, the PCBs that we've heard so much about here in North Carolina, bear a molecular resemblance to DDT, and have a similar effect. They do not cause the degree of eggshell thinning that is so characteristic of DDT and its relatives, but they are much more effective in reducing estrogen levels in the birds, which results in delayed breeding. Delayed breeding throws the critically timed reproductive cycle of osprey off. The end result is fewer young birds coming into the population. Illegal shooting is also still a problem in some areas.

To watch an osprey pluck a fish from the glassy waters of a coastal river adds immeasurably to an outing for many North Carolinians. It is an experience that children recount, excitement dancing in their eyes, to friends and relatives; it is an experience that one generation of North Carolina's youngsters missed, and there should be a lesson there. For the flight of an osprey is much more than an enjoyable experience. It betokens a healthier environment, healthier for ospreys — and eagles, pelicans, falcons and other birds of prey — and healthier for man.

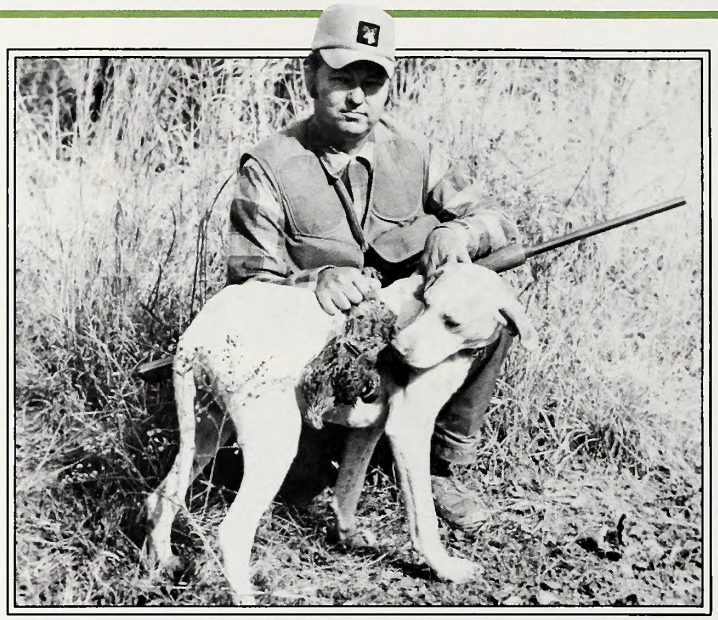
Don't Blame The Foreigners

Burying The Myth Of The Mexican Quail

Written and Edited by Mark Taylor

"Ask A Biologist" is a series of articles on wildlife management that appears periodically in *Wildlife In North Carolina*. The author is Carl Betsill, a Wildlife Commission biologist who specializes in the management of small game and urban wildlife.

Question: I've heard that bob-white quail were bigger — and less wild — years ago before Mexican quail were stocked in the state. Is this so?



Luther Partin

Mostly Memories: *Many sportsmen feel that the quail of the past were bigger than those found today — and that stockings of Mexican quail made native bobwhites smaller and wilder. Studies show, however, that the average Mexican quail is only a quarter-ounce smaller than a bobwhite. And in all probability, very few of the Mexican quail in North Carolina survived long enough to breed.*

Invariably, when a group of bird hunters begin discussing the difficulty of quail hunting these days, someone in the group will blame it all on the Mexican quail. The conversation usually goes like this: "I wish the old-fashioned bobwhite was still around. Remember how big they used to be. Now, all we have are these Mexican quail."

"Yeah," says another. "The old-fashioned quail weren't as wild as Mexican quail, and didn't light in trees either."

Is there anything to these stories? There is no doubt that in some areas quail seem to be wilder and light in trees more often than they used to. Size is another story. Unfortunately, we have no accurate way of comparing the size of our quail today with the birds of the past. In the old days, weights were usually measured with spring scales — which were very inaccurate — and small changes in average weights would be hard to detect. And assuming there are weight or size differences, could all of these physical and behavioral changes be attributed to stocking Mexican quail?

First, let's take a look at the Mexican quail. The Mexican quail is a subspecies of bobwhite quail that is native to Texas and Mexico. Average weights of Mexican quail are about a quarter-ounce less than bobwhites in the Southeast. These birds were first brought to the Southeast in 1910, although the peak introductions of Mexican quail occurred in 1937.

Mexican quail were introduced in North Carolina between 1928 and 1945, and records show that 10,000 of these birds were released. Survival of the Mexican quail — like other stocked quail — was extremely low. In fact, studies show that less than six percent of the quail stocked in the fall will survive until April. Given this survival rate, it is likely that only about 600 of the Mexican quail that were released lived long enough to breed. It's inconceivable that so few birds could change the size and behavior of our native quail populations throughout the whole State. In addition, Mexican quail are adapted to very arid, open regions of the Southwest. There is no reason to believe that they could successfully compete with native birds which have had thousands of years to adapt to the dense vegetation and humid climate of North Carolina. For these reasons, most biologists discount the importance of Mexican quail in influencing the changes we have seen in our quail populations.

If Mexican quail aren't to blame for these changes, then what is? The size difference — if it exists at all — is difficult to explain. We tend to remember only good things from the past, so perhaps we only remember the bigger birds. Changes in behavior are easier to explain. First, changes in habitat have made it necessary for birds to become wilder. After all, it's much farther between good escape cover today than it was before the days of clean farming.

Changes in crops also make a difference. Since more soybeans are grown now than in the past, the birds spend less time in the fields and more time in the woods. A quail will fill up sooner on soybeans than on wheat or lespedeza. Heavy hunting pressure in the past may also have contributed to changes in quail behavior. Those quail coveys which were easy to hunt were killed — while the wilder birds survived to pass on wild traits to their offspring. Consequently, we may have unknowingly culled out the easy-to-hunt birds. Whatever the cause for these changes, though, there's still no doubt that the quail is a fantastic game bird.

Although we believe that Mexican quail could not have adversely affected native bobwhite quail, we will never know for certain. The introduction of foreign wildlife to our State has always been a risky undertaking. We were probably lucky with Mexican quail — but we may not be so lucky with other out-of-state imports. The chances of improving our hunting opportunities by importing exotic game species are not worth the risk we take in damaging our native wildlife populations.

Money Will Help Waterfowl

State Waterfowl Stamp On Sale

The North Carolina Wildlife Resources Commission recently announced that a painting of a drake and hen mallard by well-known wildlife artist Richard Plasschaert had been selected as the design for the first of State waterfowl stamp and print program.

"A selection committee picked this design because of the subject's realism and because the overall composition lends itself very well to reproduction in both the stamp and print formats," said Sid Baynes, chief of the Wildlife Commission's Division of Conservation Education and contract administrator for the stamp program. "Richard Plasschaert, who has been an artist for twenty-five years, was the winner of the prestigious Federal duck stamp contest in 1980. He has also been selected as the artist for the first North Dakota habitat stamp, the 1983 Louisiana turkey stamp, the 1983 Pennsylvania conservation stamp and the 1983 Quail Unlimited stamp. Also, Mr. Plasschaert, because of his skills in oils, acrylics, and watercolors, has works displayed throughout the country. Some of the places displaying his works are: The National Academy Galleries in New York; the Easton Waterfowl Festival in Easton, Maryland; the Minnesota Wildlife Heritage exhibit in Minneapolis; and the Leigh Yawkey Woodson exhibit in Wausau, Wisconsin."

North Carolina becomes the twenty-fifth state to initiate a waterfowl stamp program. The State law which created the program requires that the purpose of the program be to raise money for waterfowl conservation in North Carolina.

Stamps, which will sell for $5.50, will become available in July for purchase from stamp and print dealers as well as from Wildlife Commission license agents. Sport'en Art, Midwest Marketing, Sullivan, Illinois 61951 will publish the prints. Limited edition prints will be sold to the public through the publisher, print and art dealers, Ducks Unlimited, and the N.C. Wildlife Federation. The edition size will be limited to the orders received by August 31, 1983. Image size of the full color prints will be 6½ x 9 inches, and the overall size will be 12 by 14 inches. The price of the regular signed and numbered print will be $135.00, and 150 artist's proofs will be available at a price of $250.00 each. There will be no remarques. Color separations and dealer materials are available for use by qualified individuals and organizations. These may be obtained by contacting either Sid Baynes at the North Carolina Wildlife Resources Commission or Sport'en Art.

"The Commission is very excited about the potential of our waterfowl stamp program," commented Baynes. "This program offers an excellent opportunity for individuals to voluntarily contribute to waterfowl conservation while making a purchase which will greatly appreciate in value."

Ken Taylor

A Good Investment: *Art prints of North Carolina's first waterfowl stamp — which was painted by well-known wildlife artist Richard Plasschaert of Minnesota — are not only a beautiful addition to any home, but are also likely to appreciate in value. Art prints of the stamp are available from art and print dealers, Ducks Unlimited, and the N.C. Wildlife Federation. These waterfowl stamps will be available from license agents after July 1.*

Can Be Done Over Grill

Smoked Fish A Delicious Treat

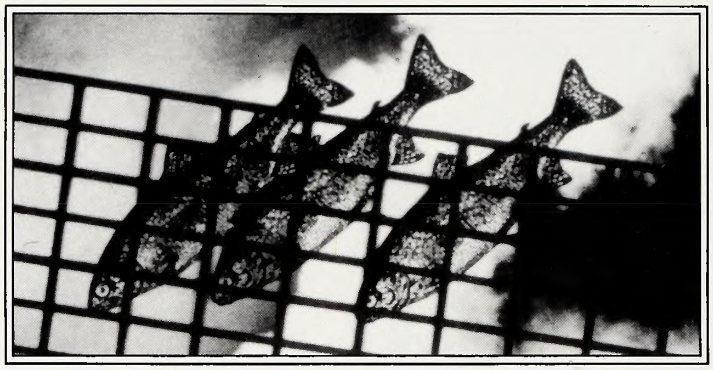
An interest in smoke-cooking has badgered me since my formative years. It stems, I think, from boyhood dreams of self-sufficiency — Indian style — on the Great Plains, and from limited experience with ham and sausage from the family smokehouse. I also suffer from an early conviction that anything that follows one so doggedly as campfire smoke should be put to constructive use.

That interest has led to a bit of experimentation with smoke-cooking, and to a considerable amount of browsing through cookbooks looking for information on the topic. The experimentation has proved, to my satisfaction, that smoked foods are among the best that cross the palate, and my search has turned up a few proven recipes and techniques for smoke-cooking that I would like to pass along.

We haven't space to cover the whole gamut of smoking and smoke-cooking foods. However, the fishing season is now at its peak in North Carolina, and smoked fish is a treat that shouldn't be missed. Let's take a look at how it's done.

The Fish

Any species will do. Bass, crappie, bluegills, trout, catfish, sea trout, spots, croakers, mullets — to name a few — all smoke well. An attraction of smoke-cooking fish is that species high in oil content — those least desired at the dinner table — are considered by many to be superior when smoked. Before smoking, fish should be scaled but the skin should be left on (except catfish and eels), and those more than 1-1/2 inches thick should be split down the middle. The fish should be soaked in brine for the length of time indicated on the chart.



The Brine

Brine should be made by dissolving one cup of non-iodized salt and 1/4 cup of brown sugar in 1 gallon of warm water. Other spices — such as black pepper, onion, bay, etc. — may be added to taste. I generally add a tablespoon of black pepper and a medium-sized onion (chopped).

Immerse the fish in the brine solution and soak for 30 to 45 minutes (see chart), or longer if you like saltier, smoked fish.

The Smoker and the Smoke

A number of commercially made smoke chambers are available, and if you're fortunate enough to have one of these, you're ahead of the game. If not, however, any hooded, charcoal grill can be drafted into service.

Begin by starting a charcoal fire in your hooded outdoor cooker, using fewer briquettes than usual to maintain a low cooking temperature. Keep the briquettes in a tight clump on one side of the fire pan. Have on hand about a pound of wood chips, and soak these in water. Hickory and oak are commonly used for chips, but you may want to experiment with apple, ash, maple, cherry or dogwood. Remove as much bark — as well as leaves and other trash — from the chips as possible because these materials will result in an acrid, unpleasant tasting smoke. Avoid pines and other woods with a high resin content.

Remove the fish from the brine solution, let it air-dry until it is tacky to the touch, brush it with vegetable oil, and place it (skin-side down) on a well-greased grill. The fish should be at least 4 to 6 inches from the coals, preferably on the opposite side of the fire pan.

Cover the coals with wet chips, and — keeping them covered — smoke the fish for the time indicated on the chart. Use an oven thermometer in a vent to check the temperature, and baste the fish occasionally with vegetable oil.

Smoked fish may be served as a main entree with dinner, as an hors d'oeuvre, or as an additive or stuffing for other fish and seafood recipes. Enjoy!

— *Curtis Wooten*

Smoking Chart

Size and Shape	Amount To Serve 6	Marinate in Brine	Cooking Temperature	Cooking Time
Fillets or steaks, 1/2-inch thick	2 lbs.	30 minutes	150-175 200 250	1 hr-30 min. 45 minutes 30 minutes
Fillets or steaks, 1-inch thick	2 lbs.	45 minutes	150-175 200 250	1 hr-45 min. 30-45 min. 30 minutes
Whole dressed fish — 1 1/2 to 2 1/2 pounds (split down middle)	3-4 lbs.	30-45 minutes	150-175 200 250	2 hours 1 hr-15 min. 45-50 min.

Robins Are Caught In Love Nest

It was spring — the season of love and mating. Flowering trees on the campus of the University of North Carolina at Greensboro framed the Alumni House, a favorite site for spring weddings. Many a couple had descended its steps amidst showers of rice, leaving their college days behind to build homes elsewhere.

The newly wedded couples, however, were not the only ones who built love nests after the ceremonies. A pair of enterprising American robins were inspired to build right on the scene, as evidenced by the bits of bridal paraphernalia seen hanging from their nest amid the crab apple blossoms along the bridal path. Woven into their nest were filmy swatches from a wayward bouquet, along with squares of net from the beribboned bags in which guests carried rice.

Perhaps the birds — college residents, if not students, had learned the meaning of throwing rice, and wished to ensure the fertility of their union by participating in the ritual. No doubt they had also been made conscious of the importance of the recycling of materials. Or perhaps they were romanticists who became caught up in the gaiety of the wedding party and decided to make the memory a permanent part of their lives together. At any rate, from the deserted nest, once more surrounded by apple blossoms, the gossamer remnants of last year's mating season still flutter in the breeze — a fitting reminder of the romantic rites of spring.

— Christine Foster Meyers
Winston-Salem

Book Review

Exploring the Lighthouses of North Carolina, by Cindy Corey. Published by the Provincial Press, Box 2311, Chapel Hill, N.C. 27514. Softcover, 43 pp. $6.95 includes mailing.

All 10 of North Carolina's lighthouses and lightships are profiled in this delightful book. As lovers of the Tar Heel coast know, North Carolina lighthouses are rich in history. They have survived countless hurricanes, some were damaged or destroyed by Confederate and Union forces in the bitter struggle to control North Carolina ports and the Outer Banks during the Civil War, and some were even attacked by German forces in World War I. As this book shows, many North Carolina lighthouses are truly unique.

For example, the Cape Hatteras light, at 208 feet, is the tallest in America. Built in 1869 on the site of a previous light which was badly damaged during the Civil War, its massive form contains over 1,200,000 bricks which came from a brickyard on the James River in Virginia. Stone for the base of the structure was obtained from a quarry in Vermont. Massive longleaf pine timbers — immersed in salt water below the low-tide mark — help support the lighthouse, and still show no signs of rotting.

The early Cape Hatteras light was not the only victim of war. One of the Diamond Shoals lightships was sunk by a German submarine in 1918. Lightships have been anchored near Diamond Shoals since 1824, and several were rammed and sunk by passing ships in bad weather. Eventually, lightships were replaced by the Diamond Shoals Light Tower, which was built in 1966.

North Carolina may also boast of the oldest and newest lighthouses in America. The oldest surviving light, at Ocracoke, was built in 1823. The Oak Island light near Southport is the newest. Built in 1958, its 20-million candle-power beacon is the most powerful in America, and is second only to a lighthouse on the English Channel in France.

All told, this is an excellent book. The text, while short, is interesting and informative. Printing and paper quality are high, and the watercolors done by Keith Rose of Greensboro add a nice touch. Excellent maps showing the location of each light were done by Kate Russell Forbes of Salem, Virginia. Although the book is small, it fits nicely in a daypack or glove compartment for a trip to the coast.

A Little Help From Our Friends

Life for trout in Bearwallow Brook — located at the Cradle of Forestry on the Pisgah National Forest — is a little better now thanks to members of the Charlotte Rocker chapter of Trout Unlimited, and the Charlotte and WENOCA chapters of the Sierra Club. Members of these organizations recently built habitat improvement structures for trout as part of an educational exhibit featuring modern forest management on national forests.

"Volunteers from these organizations built four structures to improve trout habitat on Bearwallow Creek — including a wedge dam, K-dam, and single and double-wing deflectors," said Don Fisher of the U.S. Forest Service. "These volunteers worked very hard on this project, and we greatly appreciate their help. A Forest Service fishery biologist provided technical assistance.

"Structures like these provide additional habitat for trout in small, shallow streams — like Bearwallow Brook. Pools are provided which offer fish shelter and better feeding opportunities. Similar projects are under way on other small creeks on Forest Service lands."

Other exhibits at the Cradle of Forestry featuring modern forest management include wildlife management, logging and forestry practices, and forest products.

"A visit to the Cradle of Forestry offers a glimpse of the old and the new," Fisher concluded. "Now a National Historic Site, the Cradle of Forestry was the location of the first forestry school in America — which was set up and run by a German forester named Carl Schenk on the Biltmore Estate at the turn of the century. Visitors may enjoy comparing living conditions and forestry practices at the turn of the century versus those used today."

Calendar Of Events

June 3-5
Ducks Unlimited State Convention at the Ramada Inn at Atlantic Beach. For more information, contact Ducks Unlimited, Route 1, Box 20-Z, Clinton, N.C. 28328.

June 4-11
McDonald's Big Rock Blue Marlin Tournament and Festival at Morehead City. For more information, write P.O. Box 1673, Morehead City, N.C. 28557.

June 11-12
Gun Show at the Raleigh Civic Center. For more information, write Raleigh Civic Center, 500 Fayetteville Street Mall, Raleigh, N.C. 27601.

June 12-19
Hatteras Marlin Fishing Tournament. For more information, write the Hatteras Marlin Club, Box 218, Hatteras, N.C. 27943.

June 14-15
Old Homes Tour and Pirate Invasion at Beaufort. For more information, write to the Beaufort Historical Association, P.O. Box 1709, Beaufort, N.C. 28516.

June 15-19
N.C. Rhododendron Festival at Bakersville and Roan Mountain. For more information, write to the N.C. Rhododendron Festival, P.O. Box 407, Bakersville, N.C. 28705.

June 16-18
8th annual Highland Heritage Art and Craft Show at the Asheville Mall. For more information, write to Betty Kdan, 40 Hyannis Drive, Asheville, N.C. 28804.

June 18
15th annual National Hollerin' Contest at Spivey's Corner.

June 18
Blue Crab Derby at Morehead City.

June 18-19
15th annual Tar Heel Regatta (power-boat races) at Lake Wheeler in Raleigh. For more information, write to Doug Taylor, 3613 Fernwood Drive, Raleigh, N.C. 27612.

June 18-19
26th annual Governor's Cup Regatta at Townsville on Kerr Lake. For more information, contact Kent Mullikin, 101 Windsor Place, Chapel Hill, N.C. 27514.

June 27 — July 1
Outdoor-Environmental Education Workshop for teachers at the Clemmons State Forest near Clayton. Activities include field investigatons in forestry, wildlife, soils, and water conservation. For more information, contact the N.C. Wildlife Resources Commission, Rick Estes, Division of Conservation Education, 512 N. Salisbury St., Raleigh, N.C. 27611 or call 919-733-7123.

June 30-July 4
Great Smoky Mountain Heritage Festival at Robbinsville. For more information, contact the Graham County Chamber of Commerce, P.O. Box 1206, Robbinsville, N.C. 28771.

Clean Water Worth Every Penny

Most Americans want clean water — and they're willing to pay for it! A recent public opinion poll conducted by Louis Harris and Associates, sponsored by the Natural Resources Council of America, found that a large majority of Americans want clean, safe water.

Curbing water pollution was named by 74 percent of the adult population as "very important" in improving the quality of life. Americans also do not feel they must sacrifice environmental quality for economic growth. By 89 to 6 percent, citizens are convinced that such a tradeoff is not necessary.

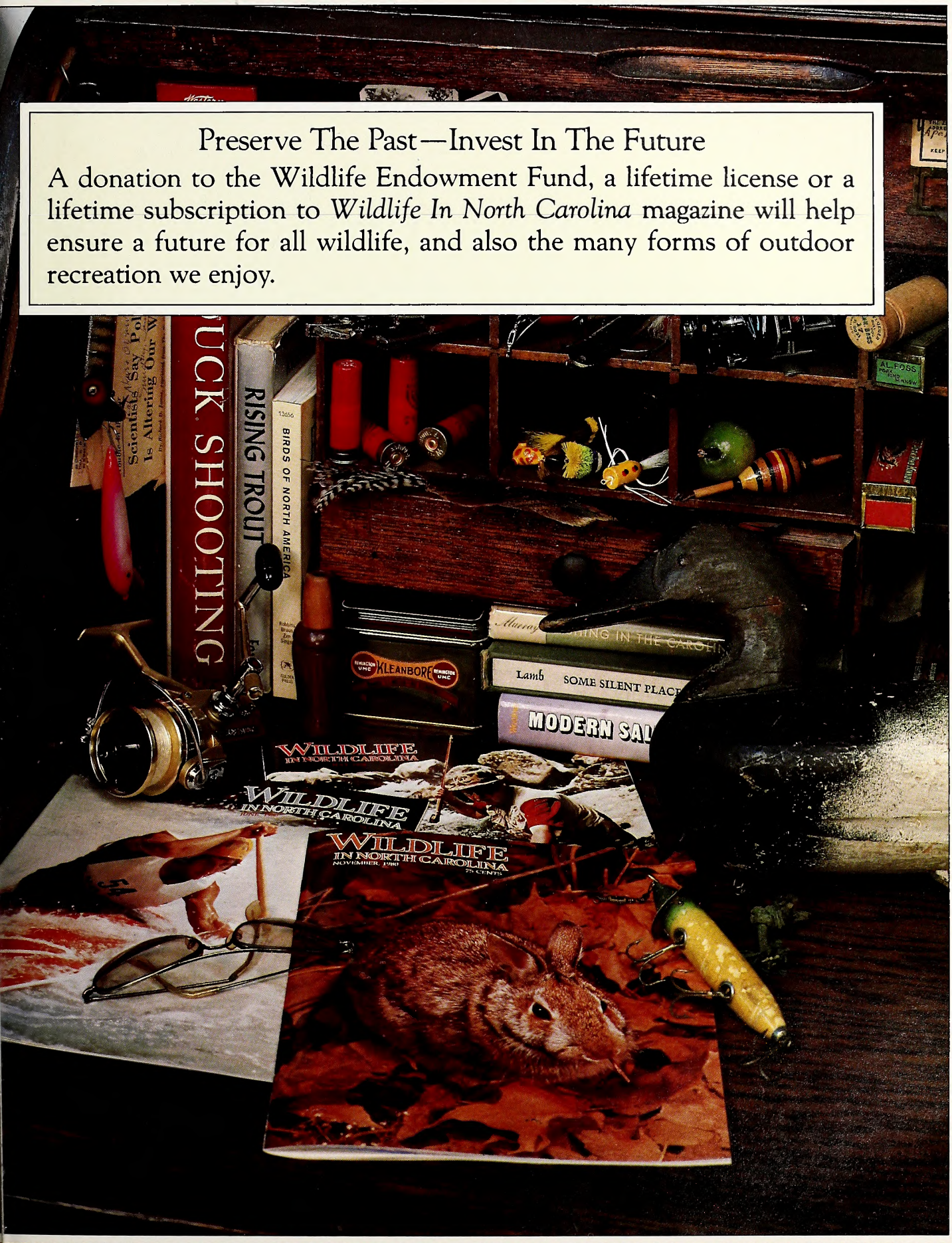
Public support for the Clean Water Act, which Congress will consider extending this year, is also strong. Ninety-four percent of the public wants the Act to be kept as tough as it is currently.

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina,* and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status On March 31, 1983

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	3942	$1,133,156.40
Lifetime Hunting License	51	8,372.63
Lifetime Fishing License	129	20,795.82
Lifetime Subscriptions to Wildlife in North Carolina	144	15,149.95
Contributions		15,126.00
		$1,192,600.80


Preserve The Past—Invest In The Future
A donation to the Wildlife Endowment Fund, a lifetime license or a lifetime subscription to *Wildlife In North Carolina* magazine will help ensure a future for all wildlife, and also the many forms of outdoor recreation we enjoy.
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NOVEMBER 1980
75 CENTS

Waterfowl Collectibles

Prints of North Carolina's first State waterfowl stamp painted by Richard Plasschaert are certain to become a collector's item, and buyers will also be helping waterfowl. For details, see inside.

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WILDLIFE IN NORTH CAROLINA

JULY, 1981

75 CENTS

The Conflict That Isn't

by Jim Dean

You could call this an open letter to our readers; an appeal to people who share with us a love of wildlife. On the surface, some of our readers don't seem to have much in common. There's the nice lady next door who feeds birds and hates hunting. Then, there's the fellow down the street with the muddy pickup truck which sports several shotguns and fishing rods on a rear-window rack.

Those of us who produce this magazine are reminded of this apparent conflict almost daily. And puzzled and challenged by it, too, I might add. The reminders come in the form of letters, notes written on renewal blanks, telephone calls and comments at various outdoor shows. Sometimes, they come from close friends or business associates, even family members.

"I am appalled," some letter writers will begin, "by the amount of hunting and fishing that appears in your magazine. It's cruel." The very next note is likely to argue the exact reverse. "You don't have enough hunting and fishing in your magazine to suit me. If I want to read about endangered plants, hazardous wastes or coastal land management, I'll buy an environmental magazine."

"What, pray tell, have articles on pesticides, honeybees or waterfalls got to do with wildlife?" wrote one reader recently. To which, I confess I'm tempted to offer the old childhood refrain, "If you don't know, we ain't going to tell you." But the truth is that we *are* going to tell him — or at least try.

First, let me say that we appreciate those readers who take the time to write — not only the vast majority who are complimentary, but also those who are critical. We've gotten some good ideas from letters. Normally, we answer critical letters with the explanation that *Wildlife In North Carolina* is the official publication of the N.C. Wildlife Resources Commission, a State agency that is charged with regulating hunting and fishing in the State, and also with the research, management and habitat improvement for both game and nongame species. Therefore, our constituency and readership is necessarily a mixture of both sportsmen and nonsportsmen.

We realize that many readers are not interested in pure hunting and fishing articles, so we include a full range of articles on the environment, natural history, endangered species and similar subjects. Over the years, the mix of sporting and nonsporting articles has been about 50-50, though an exact balance is not always possible with each issue. The season also influences content.

Our magazine has been at the forefront in covering many controversial environmental issues of concern to North Carolinians, including hazardous wastes, the threat of clean farming, peat mining, coastal and mountain development, and others. We are also widely used in schools because of our frequent natural history articles on birds, plant life and ecology.

True, we cover hunting and fishing because these are important sports that, properly regulated, do no harm to wildlife populations and actually furnish millions of dollars for research and management that benefits all wildlife. We believe that most readers understand this, and while some may prefer to read our articles on wild flowers or life in a salt marsh, for example, they recognize that hunting and fishing have a place in the overall scheme.

But our choice of subject matter goes far beyond our status as a wildlife agency. The lady who feeds birds and hates hunting and the man who drives a pickup truck full of fishing and hunting gear have more in common than they suspect. Certainly, they share more in common with each other than they do with someone who is indifferent to bird-watching, hunting, fishing or anything else of an outdoor or environmental nature. That is because both are working towards the same goal — both seek to ensure a sound future for all wildlife.

Those who hunt and fish are at least as concerned about the future of wildlife as those who neither hunt nor fish, and it seems wasteful for these two factions to be at odds when their ultimate goals are so closely related. Some of this nation's most effective environmentalists have been sportsmen. Without Theodore Roosevelt — an avid hunter — there would be no national park system. Without Ding Darling, there would be no national wildlife refuges, national duck stamp or migratory bird laws. As an avid hunter, Darling campaigned for years against wasteful land practices, unregulated hunting, and many other critical environmental problems in the 1920s and 30s. These and other sportsmen led this nation to its current awareness of our fragile environment, and it would be wrong to turn our backs on them.

Likewise, the hunter who ridicules an avid bird watcher or other nonsportsman is actually poking fun at a natural ally. For example, nonsportsmen like Rachel Carson led the fight against unwise use of pesticides which decimated many bird species like eagles and pelicans, and those same poisons are affecting game species like quail and rabbits.

The theme of this magazine is one we think should be shared by all magazines which cover wildlife and the environment, and that theme is quite simple. We're all in this together. We share a common goal, and there should be room for mutual respect, if not mutual interests.

Yes indeed, articles on deer hunting go hand in hand with articles on endangered species, and bass fishing is surely connected to pollution, and we'll continue to cover it all and hope for a little tolerance and a lot of cooperation. Our biggest challenge is to reach those who are indifferent; those who are neither bird watchers nor hunters. Unless we get their support, our hopes for the future are doomed.

July, 1983
Volume 47, No. 7

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

CONTENTS

4 **Jigging And Chugging** *by Joel Arrington*
You don't have to troll to catch the big ones offshore. These tactics work well, and they're also more fun.

8 **Only Girls and Grownups Grumbled In July**
by Mike Gaddis
A creek winds through every childhood memory, or at least it ought to.

14 **An Insect Rip Van Winkle** *by Harry Ellis*
Wouldn't you be singing in the treetops if you'd taken a 17-year snooze in a burrow in the ground?

18 **Art Prints From Nature** *by Lawrence S. Earley*
Kids as well as adults can make handsome prints of fish and other natural objects using this ancient technique.

23 **Snapper!** *by Terry Shankle*
Though snapping turtles have been around for a million years, their way of life is still largely a mystery.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

Back Of The Book *by Mark Taylor*

Cover *Chunking rocks in a creek may seem like an idle pastime for two kids, but carefree days spent in such a place are never forgotten. Ted Dossett captured this moment of graceful innocence on the Eno River.*

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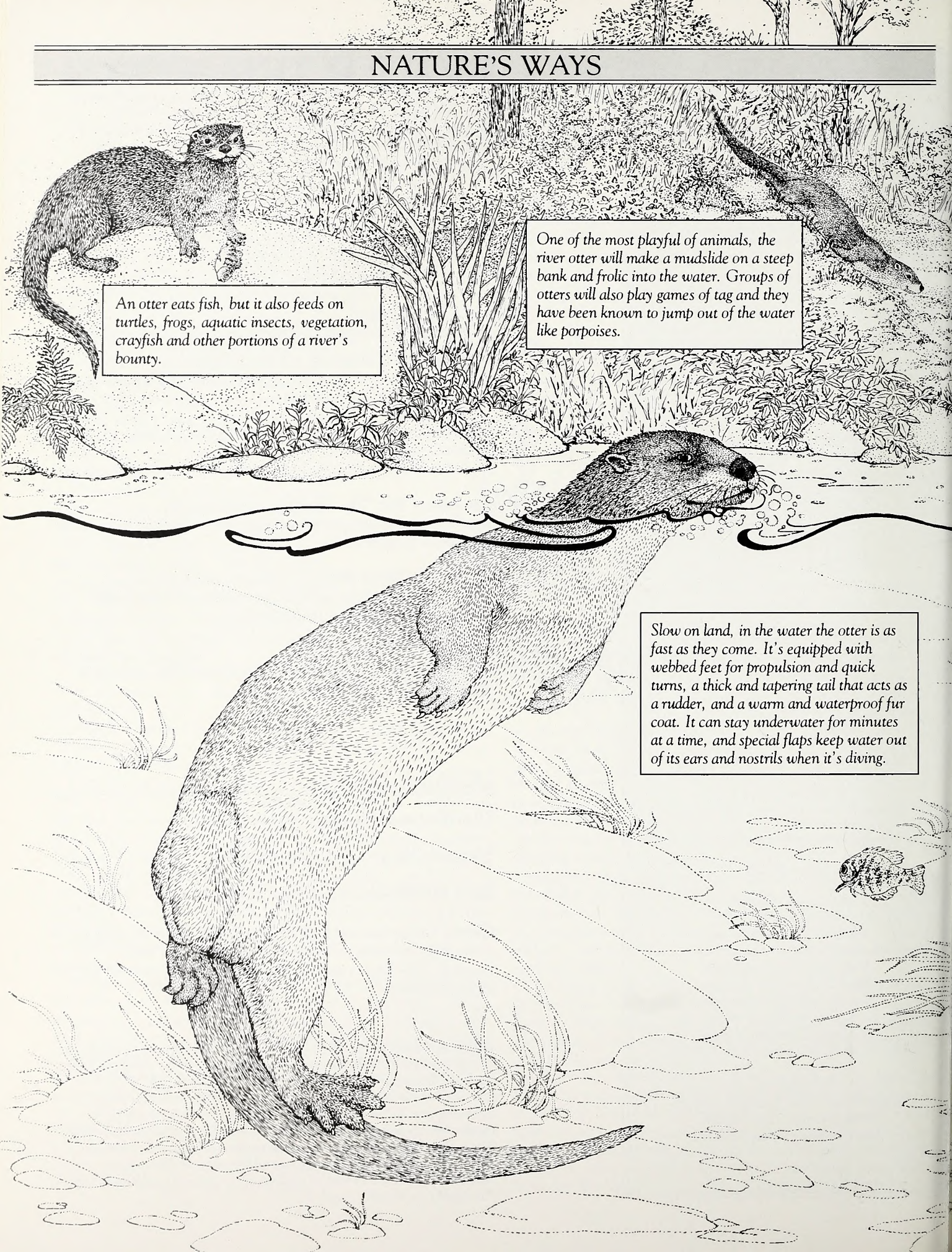
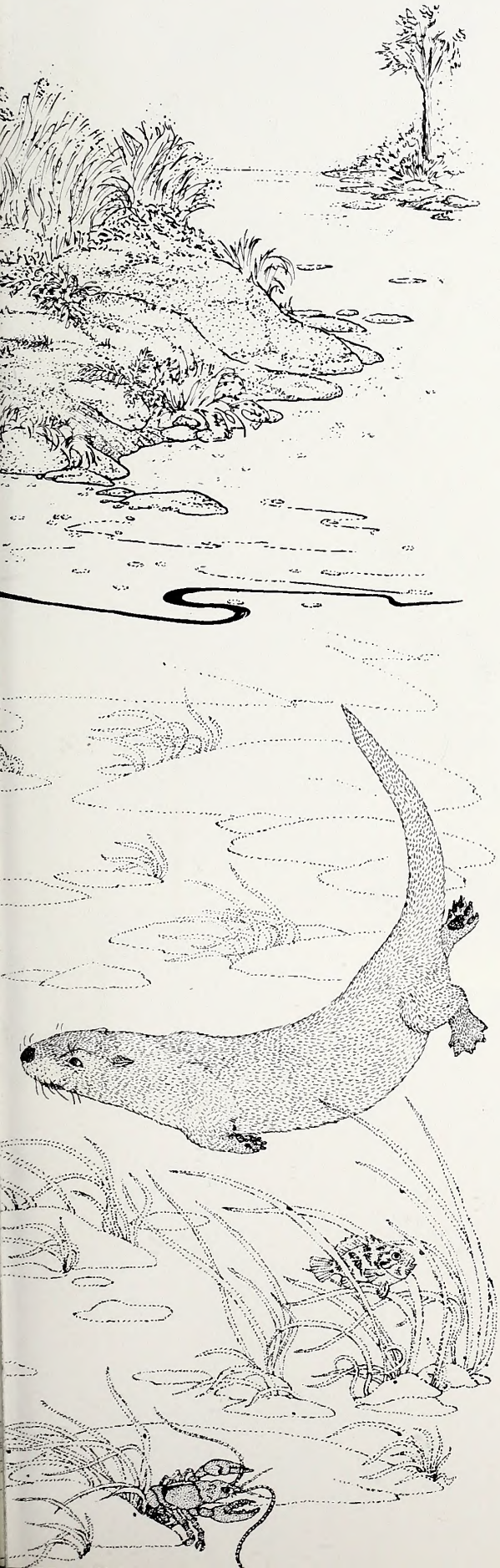


An otter eats fish, but it also feeds on turtles, frogs, aquatic insects, vegetation, crayfish and other portions of a river's bounty.

One of the most playful of animals, the river otter will make a mudslide on a steep bank and frolic into the water. Groups of otters will also play games of tag and they have been known to jump out of the water like porpoises.

Slow on land, in the water the otter is as fast as they come. It's equipped with webbed feet for propulsion and quick turns, a thick and tapering tail that acts as a rudder, and a warm and waterproof fur coat. It can stay underwater for minutes at a time, and special flaps keep water out of its ears and nostrils when it's diving.



The River Acrobat

written by Lawrence S. Earley/illustrated by Anne Runyon

Anyone who says that nature is all "red in tooth and claw," as the poet Alfred Lord Tennyson once did, hasn't seen an otter at play. Nature writers sometimes give the impression that the world of wildlife is guided by one grim purpose — the struggle for survival. What, then, do they make of an otter doing a belly flop into a river down a slick mudbank, its short legs tucked behind it like fins? How explain the way otters dunk each other in the river, the way they play tag or swim together like porpoises? There seems to be an element of playfulness about otters, a zest for life, a frolicking enthusiasm over and above the usefulness such activities have for survival. The high-spirited otter, that relative of the weasel, may teach us that there's more to life than "mere" survival.

Not that the otter is all clown. As one of the top carnivores in the river, sharing that role with man and the osprey, his tooth is frequently red. His short legs can carry him overland from a river to a farm pond, for example, but just barely, for he's awkward and slow on land. In the water, however, he's all grace and lethal movement, easily matching the evasive tactics of a panic-stricken bass. His body is built for subaquatic speed. Webbed feet help to propel him; a long and thick tail rudders him; and a coat of warm and well-oiled fur waterproofs him. His streamlined form cleaves through the water's resistance. He's the fastest land mammal in the water.

He'll eat just about anything, too. Able to swim underwater for a quarter of a mile, or up to four minutes at a time, he'll take bass, sunfish, perch, bowfin, carp, minnows and herrings. This fish diet doesn't make anglers happy, many anglers considering the otter a competitor for game fish. But an otter will just as easily pass up a bass for a crayfish. Turtles have been found in otter stomachs; so have snails, frogs, clams, aquatic plants, and other portions of a healthy river's bounty. Of course, water pollution will prevent a river from serving up such rich fare, and as the health of a river declines, so does the otter population on that river.

Otters mate in early spring, but they don't give birth until the following spring. This doesn't mean they have a gestation period longer than a human's. The actual gestation of an otter takes about two months, but because of a feature called "delayed implantation" the development of the embryo is halted quite early. The embryo goes dormant for eight months or so and only continues developing again in the winter.

The litter of one to five kitten-sized young is born in an abandoned beaver or muskrat den, or in a riverbank burrow. Like many mammal young, the kits are helpless at birth. They open their eyes only after five weeks. The female devotes herself to their care for a year, and then with a new litter coming on it's time for the young otters to seek their own way. Unlike many creatures who take to the water, young otters seem to be afraid of the water, requiring some motherly encouragement to take the plunge. Most succeed in this form of education, and before long the otter young have joined their mother in the water, splashing and diving and taking part in other otter hijinks.

It's not clear whether otters were ever more widespread in North Carolina than they are now. They are found chiefly in the Coastal Plain — in sounds and estuaries, and along rivers, streams and canals. They are rarely found in the mountains, and this has been laid at the door of pollution, loss of habitat and overharvesting. It just may be, however, that otters were never very common in the mountains.

Rare and memorable is the sight of an otter at play. Count yourself lucky if you see one on its river mudslide, but hope that it occurs when your spirits are dragging the ground like a flapping shoe sole. We all need otters in our lives, but on some days we need them more than others.

adidas

jigging and chugging

These alternatives to offshore trolling produce fast action with big fish.

written and photographed by Joel Arrington

On an uncommonly still and hot day off Cape Hatteras, we huddled exhausted in the thin shade of the cabin and pulled deep draughts from cold beverage cans. By some travesty of democratic principles, I was chosen to be the sacrificial lamb.

"But I caught the last jack," I protested.

"Go get 'em," they urged unsympathetically and I staggered into the blazing sunlit cockpit to pick up a stout deep-jigging rod and drop the 3-ounce lure yet once again.

It was to be my grim mission to hook an amberjack that sulked with its fellows deep below us on a wreck so that one of us might catch a cobia that ran with them. Earlier the amberjacks had been cooperative, rising to meet our boat when we arrived and instantly taking our big surface plugs when we cast them. We hooked many, but boated and released only a few, because most of them had cut us off in the wreck. Now all of us had pulled on all the amberjacks we wanted for one summer day and yearned to either cool off or tangle with a more interesting adversary. In their willingness to strike, amberjacks sometimes fail, like promiscuous women, to impart to the angler a sense of privilege. He loses interest.

Moments earlier, we had seen a cobia when it had followed a hooked amberjack to the surface. It was a good fish — maybe 40 pounds — but, like cobia everywhere, not easily enticed to a lure. In fact, almost always, if you do not put a jig right in front of a cobia and work it seductively, it will not take.

However, if you can hook another jack and get it and its excited mates close to the boat, it will sometimes bring the cobia up with it and, if you are lucky, in a moment of gluttony the cobia will take your lure.

My jig was rifling toward bottom in water so clear I could see the jacks, distorted and shadowy, 50 feet below. I turned the reel handle to engage the gears and lifted the rod tip in a sharp upward sweep. Rapidly taking up line as I dropped the tip, I ripped the lure upward again and the rod stopped suddenly in midsweep and was jerked instantly to the gunwale.

"Please be a little one," I murmured.

It was maybe a 25-pound jack, not a big fish as they go, but plenty of work on a hot day. I knew if I did not push the tackle almost to the breaking point, the jack would gain the wreck and cut me off. Fortunately, the 20-pound test line held, the fish came a little and in a few minutes we could see the jack school, and one cobia, just 10 feet down.

My son, Adam, had rigged another white jig with a white, curly-tail worm. He dropped it into the water near the cobia and immediately it was charged by an amberjack. He lifted the rod tip to take it away, then dropped it in front of the cobia that was close behind. The fish took.

"Hit 'im!" I shouted and Adam set up hard with three quick jabs. The cobia headed for bottom.

That fish ended up in the box that day, as did several king mackerel and a dolphin. We released uncounted jacks and two or three barracuda, and broke off several other big fish of unknown variety. Some of

Amberjack (left) are the most common catches for those who use deep-jigging tactics, and schools of these fish are also easily attracted out of the depths (lower right) where they will take surface lures (upper right).

the jacks took topwater lures with heart-stopping strikes.

Jigging and chugging are techniques that go together like ham and eggs. You can employ each individually to reasonably good effect, but together they provide sometimes remarkably successful and exciting fishing.

Chugging refers to the use of large topwater lures of several designs. Often the most effective is one we generically call a chugger. It is a floating lure with a deep concave face that makes a loud noise and pulls a lot of air under when "chugged." There are times when amberjacks prefer this action to anything else. In addition to amberjacks, I have had strikes from king mackerel, bluefish, dolphin, and once, a wahoo. Arbogast markets a model called the Scudder in three sizes — 1, 1½ and 2 ounces. It comes with two sets of treble hooks. I usually take the forward set off because they sometimes foul on the leader. You will get more strikes, but miss more hookups this way. Lures with only one set of hooks are safer to remove from live fish, as well.

Another topwater lure we use is the pencil popper. It is an elongated lure, weighted on one end for better casting. You retrieve it fast with a wiggling motion that the fish sometimes prefer. Wooden pencil poppers made by Gibbs are tops, but all brands work pretty well.

An in-between chugger design is the Rebel Windcheater. It sinks, like the pencil popper, has a concave face like a chugger, only not as deep, yet can be run fast on the surface if you hold your rod tip high.

Jigging is vertically fishing a leadhead jig of a design that causes it to sink quickly to the bottom and return easily on the retrieve because it is pointed and knife-edged top and bottom. Deep-jigs come in several designs and weights for varying depths and wind/current conditions. I have found those weighing from 2 to 4 ounces most useful offshore, but they are made (mostly in south Florida) much larger than that.

Anglers in private boats with LORAN have the advantage over those who must charter and over private boat owners without some way to locate wrecks. LORAN is essential for finding wrecks and returning to the spot you fished yesterday. Many wrecks off North Carolina are buoyed, but the buoys are not necessarily over the structure. You have to locate it

King mackerel are among the species that can be enticed by deep-jigging methods — that is, if you can keep an eager amberjack from getting the lure first.

precisely if you are to fish it efficiently, and this generally requires both LORAN and a fathometer.

Not every charter skipper wants to fish light tackle. Some do, of course, and when you find a cooperative one, he can be of great help to you. At Hatteras, Capt. John Pierce of the "Shady Lady" encouraged jigging and chugging when he was still taking sportfishing charters, but he is now fishing only commercially. Other boats at Hatteras are available for this kind of fishing, but be sure to ask in advance. At Harkers Island, Grayson's Marina, Capt. Jim Luxton of the "Second Glance" willingly assists anglers in this kind of fishing.

Wrecks lying in up to 150 feet of water are most productive. In depths beyond that, currents usually make fishing difficult if not impossible. Even wrecks in relatively shallow water may on some days have prohibitive currents. And currents are not always directly related to wind. I remember one disappointing day off Hatteras when we had wind under 15 mph, yet Diamond Shoals Navigation Tower looked like it was in the middle of a flooding river. When I have a choice, I schedule jigging trips between the full and new moons when currents tend to be less.

Wrecks that lie close to shore are likely producers of bluefish (big ones from fall through spring), cobia, amberjack, Spanish mackerel, black sea bass, and gray trout. Farther out on the Continental Shelf to the edge of the Gulf Stream, you may encounter king mackerel, amberjack, barracuda, grouper, snapper, porgy, dolphin and wahoo. In some years, jacks and kings frequent artificial reefs quite close to shore. I have caught amberjacks from the artificial reef at Wrightsville Beach as late as November.

One of the biggest problems in this kind of fishing is cutoffs in a wreck. Usually we drift over the structure, casting a jig ahead of the drift so that the boat is over the jig when it approaches bottom or the mid-depths where jacks are holding. When the fish are big and you have to use light lines and heavy jigs to get the lure down, you are going to have cutoffs. One answer is to anchor about 100 yards up current of a wreck and chum the fish to you. You should cut fish into pieces about the size of a silver dollar, and use only the minimum amount that will pull the fish to you. Fresh fish are recommended for chum, but you may get away with canned cat food or frozen blocks of ground fish.

A trick we used once on amberjack was to wire 12-inch bluefish on a long, stiff surf rod blank. We had caught them inshore and kept them in a live well. As we drifted over the wreck, we dipped the fish overboard and teased the amberjack up, snatching the blues away when the jacks would go for them. We lured them 100 yards downwind from the wreck, then cast our lures to the, by this time, highly excited jacks.

To catch grouper, snapper and porgies, you must get your heavy jigs to the bottom and bump them along as you drift. When the water is deep, and wind and currents are stiff, it is difficult. You must use heavier jigs and lighter lines, and you must learn to cast well ahead of your drift so that the jig can reach bottom as you drift over it. Jigging is effective only when you are retrieving vertically.

King mackerel will not hit a slow-moving lure. If you do not make a jig fly, you will hardly ever catch a king. Consequently, jiggers have developed an energetic, ripping retrieve that relies on fast-retrieve reels to take up line as they drop the rod tip. I believe big spin reels on 8-foot rods are better for this work than the 7-foot plug rods and conventional reels I prefer for most deep jigging. Big spin reels loaded to capacity with 15-pound test line take up line much faster than any revolving-spool reel. Long rods also give more sweep on the retrieve. I also like to alternate spin and plug rods because of the fatigue relief that comes with change. Jigging is hard work.

Fifteen-pound test monofilament is a good compromise line size to start. For amberjacks on shallow wrecks and for cobia, which are usually hooked close to the surface, I prefer 20-pound test line. I will go under 15-pound test only when it is necessary to get lures deep. Usually this is when I need to bump bottom for grouper and snapper. Ten-pound test is as light as I have used.

It is important to have reels loaded to capacity to give the largest possible arbor size for rapid line takeup.

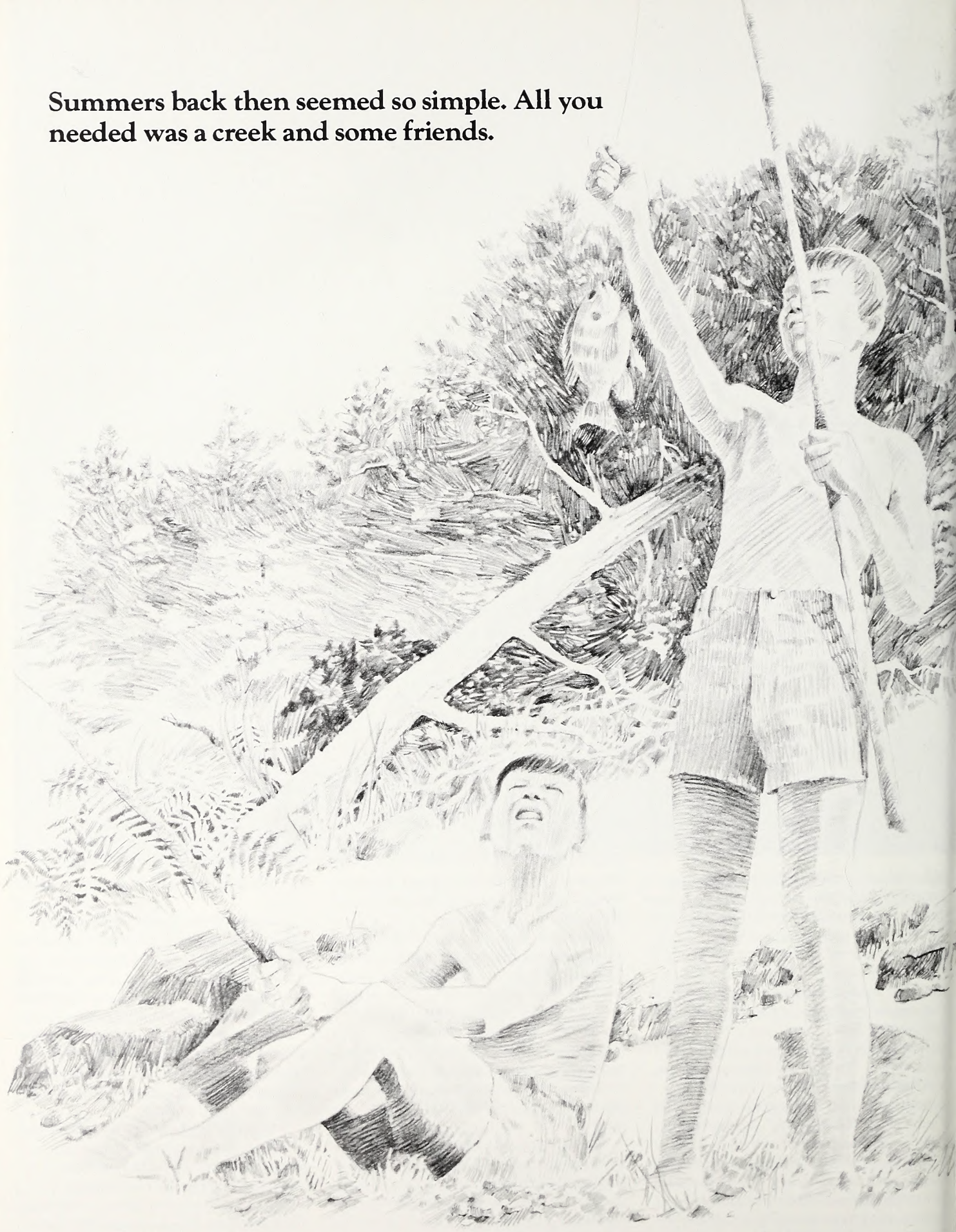
For amberjacks and cobia, a 5-inch piece of 60-pound test mono is all the leader you should use. For kings and barracuda, you must use wire. The shorter and finer the leader, the greater number of strikes you will get. Forty-pound test braided, uncoated, brown wire is my first choice. Kings will often cut you off above even a long leader because of their propensity to attack a lure from above, contacting the line way above the lure. All you can do is re-rig.

I believe all jigs should be tipped with either artificial worms or strips of squid or fish. Last summer, I saw diamond jigs outfish my leadhead jigs on kings, probably because of the greater speed at which these elongated lures can be retrieved.

Jigging rods should be quite stout. Mine will clear 6 to 7 pounds from the dock on a dead lift with 5 inches of line off the tip. They are the same rods I work the chuggers and pencil poppers with.

Not every day is suitable for jigging and chugging. But you can improve your chances for a successful day offshore, particularly during the mid-summer doldrums when trolling often is ineffective, if you leave the dock prepared with big topwater lures and heavy jigs.

Summers back then seemed so simple. All you needed was a creek and some friends.



Only Girls And Grown-ups Grumbled In July

by Mike Gaddis illustrated by Walt Obman

Summer came in a rush that year. Spring blushed past, and suddenly it was July. The sun grew more oppressive with each new morning and soon the heat monkeys were dancing feverishly against the blue haze.

Folks talked constantly of it during the day and suffered with it at night. It rivaled the worst of dog-days and you lay sweating in bed against sticky sheets in the unending, stifling stillness of it. It was blackberry time in Randolph County, and aggravated chigger bites from early morning forays added to the torment, stinging smartly with the fresh perspiration. A washbowl and a wet cloth for wiping hot foreheads became a bedside mainstay, but relief was elusive in those forever hours between midnight and dawn.

For the grown-ups there was little escape. Maybe a few stolen moments under the shade of a maple, but there was a livelihood to be won and always something waiting to be done. Decency in those days demanded more in attire of adults than now and there wasn't a lot that could be shed acceptably. The girls had the same problem, because once they got past six or so, bare chests were no longer proper. One of the blessings of boyhood was freedom from such contrivances. We promptly stripped down to cut-off pants, less when we were out of sight, and relegated hard-soled shoes to the hall closet.

For us, the curtain was rising on another joyous season, and we answered it almost instinctively. The shaded coolness, damp earth, and meandering creeks of the bottoms were beckoning.

We were country boys, by spirit if not altogether by location. Our main haunt was Taylor's Creek, from the southwest corner of Billy Walker's farm to the Union Church Bridge. Its enticing flow coursed past our most favored spots. There was the big pool below the Coble House where most of us first learned to swim, the rapids and the large rock with the cedar tree growing out of it at the Hale Place. There was the ford at Uncle Manly's we wallowed across with the jeeps on wild night rides, the Flat Rock stretch and the fishing hole above the Church. Each was unique in its own right but similar in its attraction, a

"We gathered the seed husks from the trumpet vine and squirreled them away in the house for winter. Shaped like dugout canoes, they made the finest kind of racing craft."

place to mesmerize time into something special.

From first light until the screech owls began their eerie whispering we followed our every whim, never at a loss for excitement.

That was the summer we started the grist mill on the tailrace of the Hale Place "rapids." That is, we carved water wheels from ash and dogwood as my uncle had shown us and set them up in the three narrows of the terminal chute. They were fun to make. You took your pocketknife and carved five or six flat blades and notched them so they'd fit together in the center. Then you cut the axle from a good straight limb, and slit it in the middle so you could push the blades through with a tight fit. The axle rode forked sticks on grooves that kept it laying true when you propped it in the rocks at the right height. It took some doing sometimes, but when you got things right the little wheel would virtually sing. We had all three right just one time that I can remember. We set up some accompanying machinery on the axle ends, built a mill house out of sticks, and christened her the Walker-Gaddis-McCombs Feed and Flour Company.

We cut access roads in the creek bank and added a loading dock. We took orders and set up a delivery route. We hauled "grist" from a sandbar upstream after building a trammel bridge over an intervening tributary. It might not have been recognizable to just anybody, but it was a thriving enterprise for about a week. Then one evening, a bad thunderstorm washed the whole thing into oblivion. There was no trace the next morning. We figured it ended up somewhere below the Union Church Bridge. It was a bitter loss, but a valuable lesson. You can't count on things staying the same.

We spent other happy hours on that same stretch of fast water. During our fall wanderings, we gathered the seed husks from the trumpet vine and squirreled them away in the house somewhere for winter. Shaped like dugout canoes, they made the finest kind of racing craft when they dried out. Usually on a challenge, we'd start them at the head of the run and see whose canoe got to the bottom first. Each man was allowed a long stick for navigation purposes, and its indiscriminate use invariably brought clamors of protest from the balance of the field. It was a precarious trip amid the rocks, and swampings were common. Or you'd get caught in an eddy and go nowhere while the others shot by on the mainstream current. We had special rules for that, of course, so you wouldn't fall completely out of the race. But it cost you in time and you had to count on an equal calamity with the opposition in order to stage a comeback. You lost more than you won and somebody usually slipped off a rock and fell in. For sheer enjoyment, it was hard to beat.

Near mid-day, we often followed the spring run below Uncle Manly's to the deep, cool pond at its head. Cherished as all springs were, it was neatly rocked and covered, with a speckled tin dipper hung on a nail. The water was pure ecstasy on a hot day. It was clean, clear, and teeth-numbing cold.

There was a wooden spring box in a trough below the head pool, where the cold water could flow through. Along with a fresh milking, there'd be a few summer apples, all firm and chilled. The flesh was so crisp it would pop when you bit into it. Crawfish, mud puppies, and dusky salamanders were also regular occupants. We usually rounded up an old jar somewhere and left with an assorted collection.

There was a leopard frog that lived there, too. Leopard frogs were rare. Bullfrogs and toads were good sport, but a leopard frog was a quest. We tried everything we could to catch him, given the situation. But spring holes were to be left unmolested. It was one whipping you couldn't beg out of. The leopard frog took our full measure, and we could never catch him. He taunted us unmercifully at each visit, and finally we could take it no more. One day we took the BB guns and got him, but the lifeless form in hand was a hollow victory. We sensed the loss almost immediately, wished later that we could put him back, and faced our abysmal incapacity to do so. Being boys, we didn't dwell on it, but trips there weren't the same afterwards and we knew we had cheated ourselves of something even more valuable than the frog.

Afternoons were for fishing. In years since, I've fished salt and fresh, from the Florida Everglades to the power reservoirs of the mid-Atlantic states, with a lot of stops in between. There's a lot of excitement, but nothing more delightful than the hours we wiled away lying on the bank of Taylor's Creek a short walk from home, waiting for a 6-ounce sunfish to take a cork to ride on the lazy, brown surface waters of a hole you couldn't see the bottom of. Maybe it was relatively the same, and the difference is in time and dimension, and I am the one who has changed for I find it difficult today to be truly satisfied. Then, it seems, the world was sufficiently vast to permit escape,

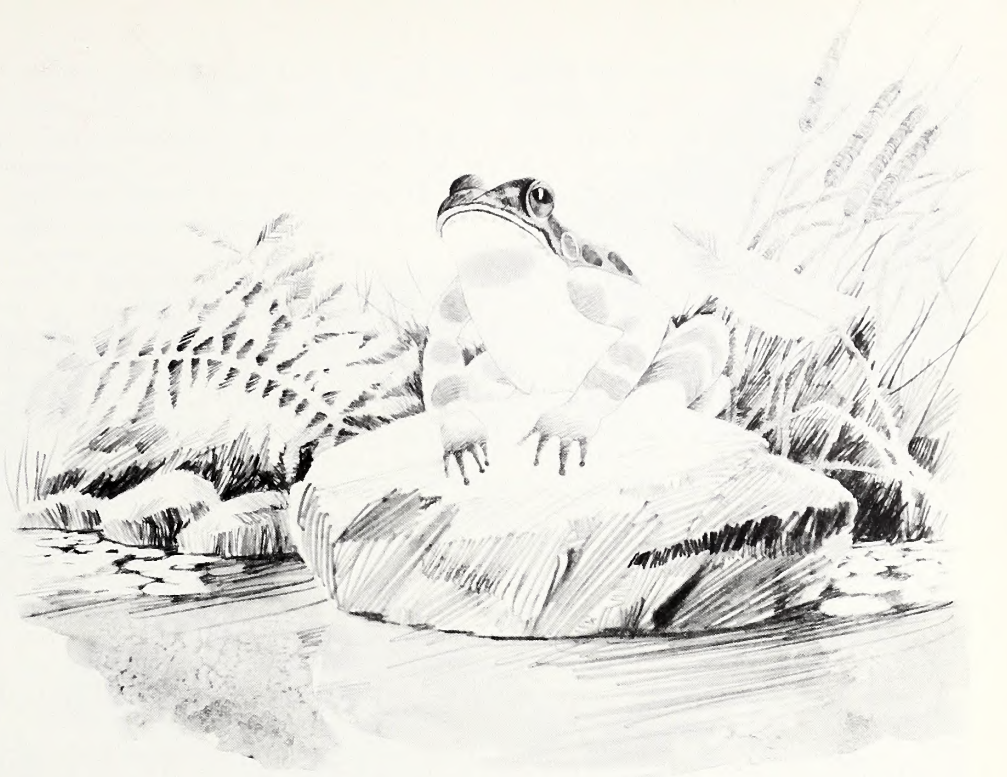
vibrant with new discovery, and without the constant dilemna of choice I now face in trying to bring back yesterday.

Be that as it may, it is a sweet memory that below the ford and beyond the rock dam at Uncle Manly's was a long, deep pool some 200 yards in length. Its intrigue and promise as a fishing spot was anchored both by appearance and reputation. It was said that Joel Ashworth had caught a 5-pound chub somewhere within its reaches one time and had seen larger. While we never came close to rivaling that, I can attest that it was a peach of a bream hole, and we came to love it. Robin, yellow-bellies, green-ears, and other sunfish were common, and we were about as happy with the horny-head suckers, yellow bullheads, and snapping turtles that rounded out the catch.

Fishing was a lot simpler then than it is now. You could walk into any country store and come out fully equipped for 35 cents. There'd be a length of line, a cork, a long-shanked No. 10 hook, and a split shot to keep it down, all neatly wrapped around a little wooden frame with the hook run back into the cork so you didn't have to worry about it when you put it in your pocket. You could buy a few extra hooks for a nickel and along then Pflueger was packing them in a little wooden cylinder about 2 inches long. Just made for a boy. Store-bought poles were unheard of. When we got ready to fish we cut one in the woods, of ash or hickory. And if you got a particularly good one with just the right backbone you cut your initials in it and hid it so it'd be there next time.

We fought Granny's chickens and the local wasps for bait. The chicken lot environs were perfect for juicy, gray earthworms big as a pencil, and an occasional wiggler. The wasp nest larvae were unbeatable as bream bait even though they often cost a sting or two and were hard to keep on the hook. You carried them in the nest and peeled back one compartment at a time to get at the fat grubs inside.

About two o'clock, we'd nestle into a well-chosen spot along the bank somewhere out of the poison ivy, thread a worm, and drop it in. We'd move it around a little now and then like we'd been taught and anticipation rode every jiggle of the cork. It was easy to fool yourself. You'd get lulled off and hit the line, the cork would jump, and you'd almost fall in trying to get to the pole, all for naught. You always hoped to see it bob right good a couple of times and then fade swiftly out of sight. When that happened, you were almost sure of hooking a pretty decent fish. But most of the time we were hoodwinked by the little stuff you never could catch.



Once in a while we would manage something spectacular. Richard McCombs caught a 3-pound catfish one time after a big rain and I had a bass that fell off just before I got him in. We took turns fighting an immense snapping turtle to a standstill, and then didn't know what to do with him. He broke off before help arrived.

We didn't get to go to ponds much on our own. There were some around, but the grown folks always figured we would fall in and drown. There was a special attraction about the bigger waters. Though we often did no better than on our creek holes, they were normally inaccessible and therefore uncharted and promising.

On one sultry afternoon in August — a day which became special — my Aunt Louise and Uncle Sidney took me to Danny Bell's pond. It was only an acre or so, but to me, it was vast and exciting. I got to use a cane pole for the first time on that trip and thought I had truly arrived. We started out near the corner of the dam, a spot I have favored on any pond since. I shook up the worm can, found the biggest, fattest one I could, and carefully threaded him on so there was no hook showing. There was a log lying about 10 feet from the bank and I dropped my hopes close beside it.

The cork had hardly come to rest when it popped under one time, surfaced again, and then set sail for good. I jerked hard and the little cane pole bent to the water. The line sang as it zipped sideways and whatever was on the other end was looking for the bottom of the pond.

"One day we took the BB guns and shot the leopard frog, but it was a hollow victory for we soon realized we had cheated ourselves of something more valuable."

I was trying as hard as I could to pull that fish up and couldn't. My Aunt and Uncle were caught up in the excitement and shouted encouragement, but at the moment I was doing all I could do. Nothing on the creek had ever felt like this! I began to have doubts about the outcome. My wrists and arms were tiring. Fortunately, about then, so was the fish, and I began to gain ground. I leaned my whole body into it and heaved him out on the dam.

There, against the green grass, in molten yellows, oranges, and reds highlighted by the late afternoon sun, lay the sunfish to end all sunfishes. He was tremendous! I was flushed, hot and trembling as I picked him up. He was bigger than a double handspread. It was a shellcracker, about 17 or 18 ounces worth, the biggest any of us had ever caught, including the grown-ups, and my spirits soared as high as any of the nighthawks riding the evening breezes. I put him in a bucket of water so we could keep him alive and we took him to my Uncle's pond at the Coble Place to turn him loose. For years, we tried to catch him again. We never did,

"I climbed out and collapsed on a rock, and sat for a long time looking at the big snake lying there in the creek. It was the first time in my life I had ever known blood-thickening fear, and I would not soon forget it."

but it was enough to know that, somewhere, he was there.

The Coble Place pond was the scene of another discovery for us that August. It had bullfrogs galore in it and we spent hours trying to capture them with little success, until we learned a trick that was their total undoing.

It was quite by accident, really. I, my brother Joe, and Don and Stanley Avent were fishing. Things were slow, so we had turned to trying to catch frogs to fill in the cracks between bites. In the horseplay and confusion which always accompanied such endeavors, Stanley got his hook caught in my brother's new red shirt. Fearing a reprimand from my mother, we worked hard to free it without damage to either Joe or the shirt. Failing, it ultimately became necessary to amputate — the shirt that is. I managed it with my pocket knife but also whacked out a small piece of cloth that stayed with the hook.

Shortly afterwards, Stanley got within pole range of "ole under-the-root" and was trying to snag him with the hook. He didn't have to. The frog took one look at that dancing bit of red cloth and promptly lolloped it in. From there, it was on. We sacrificed another swath of Joe's shirt without thought for the consequences.

It was too good to be true. You could sneak up on a frog sitting on a lily pad like a green Buddha on a throne, dangle the cloth a few inches from its nose, and the lure was irresistible. First, he'd shift a little to get a better look, then cock his head and watch it a minute. Like lightning, the tongue would shoot out and he'd have it. Setting the hook was pure reflex. There wasn't a lot you could say for their fighting abilities. But they were game through and through. We caught some real giants and they became providers for an evening meal

that was truly memorable.

I had the duel with the two big snakes at the Coble Place bridge that year. We stopped to get water for the tractor one day and my uncle saw one of them lying on the rocks sunning. It was the biggest of its kind we had ever seen. Snakes had a fascination nothing else commanded. This one was about 4 feet long, heavy, dark, and blunt-bodied. My uncle called it the bad kind.

I'm pretty sure now that it was a brown water snake, though surely one of the biggest I have seen in a lifetime around the water. Belligerent, but non-poisonous, water snakes often develop viper-like bodies as they age, and turn dark brown so that their normally distinctive markings become blurred and mottled. So cursed, they have the misfortune of often being mistaken for the cottonmouth and killed. We unknowingly made the same mistake, or maybe my Uncle Sidney knew and embellished it for me as he did everything. Whatever, it made the challenge respectfully formidable for a boy.

For the next three weeks, I staged assaults with the little Remington Sportsmaster, often three or four times between morning and afternoon. My uncle was farming everyday and I'd get up early and ride with him. A little after day, he'd ease the truck to a stop on the hill above the creek, and wait while I picked my way to the bridge. My nerves would be strung like banjo strings. Later, I'd either sneak down from where we were working on the other side or along the creek bank from one direction or the other, hoping to catch the big snake unaware.

I saw him several times the first week or so. He'd either be draped over an alder sprout growing along the creek or sunning on the rocks where we'd first seen him. About the time I'd spot him, he's slide off into the water leaving me with no chance for a shot. Or I'd hear a heavy plop in the creek or maybe he wouldn't be there at all, and I'd know he had outfoxed me.

I ended his reign one afternoon when things were in my favor. Normally, the heavy base of crushed flint on the road made a stalk from that vantage hopeless. It would roll under your feet at the worst possible time, sounding an alert. But a thunder cloud the hour before had left it soaked and the sound was muffled. I tip-toed my way to the first plank of the bridge and held my breath while I studied the limbs over the creek. I made him out among the leaves after a while, first the body and then the head. I squeezed the rifle off like I'd been taught and it was a one shot affair. We fished him out and carried him in for everybody to see.

Only a week later, a second snake took up residence in the same place. I wonder now if we weren't seeing two snakes all along, just never together, for they were identical in size and species. Illogical maybe, but it was unusual for one big snake to show up so soon after the demise of another his equal.

For more than a month this one thwarted my every attempt. I'd never hunted one more wary. I got a shot one time late in the siege, but he had me so unnerved and frustrated that I missed. A matter of pride, it worried me for days. Nothing worked. I contrived plan after plan and each one came undone in its execution. Then one night Paul Revere's name came up somehow, one by land and two by sea, and all in a moment I had the answer.

This time I would slip into the creek above the bridge and wade. The water approach would be unexpected. He'd be listening for the rocks to grate on the road or a bush to rustle, or watching for a movement along the bank. And I'd catch him in his element. I shivered with the excitement of anticipated success.

The next day at mid-morning, I walked the soft new ground below the granary to the creek bottom. The damp earth soaked up my footfall. About a hundred yards above the bridge I slowly worked a cartridge into the Remington and flipped the safety on. Then I grabbed an overhanging branch and eased myself into the water. Meticulously feeling my way through the rocks I shuffled along until I reached the bridge pool. It seemed like hours and my heart was beginning to sound like the bass drums at a homecoming parade. I inched along with frequent stops, searching every limb and every foot of bank. Tension grew with each slow step. Finally I was at the bridge itself and still had seen nothing. It was quiet except for the muted gurgle of the creek.

Then, suddenly, I felt strangely hot. And my eyes met his. His big head was thrust out of the water from a pocket of the bank about 5 feet from my right foot. He had been watching me. His tongue was beating a rhythmic threat. I felt a prickle on my neck as the hair rose and I was afraid to blink. I was afraid to even breathe. My throat got dry and my eyes were watering. He shifted slightly, the head swaying. I felt weak. I thought about help but there wasn't any. And I had another problem. I was right-handed and would have to shoot from the left side. I wasn't real good at it.

It took forever to get the rifle up, by inches, when anxiety was pleading for me to bring it up quickly like a shotgun, and just shoot. But I did it, while we stared at each other in a frozen moment. The sights were blurred in my left eye; I kept seeing two beads and they were dancing around uncontrollably. I held as close as I could and squeezed. The water exploded with the impact of the long rifle and it took a few seconds to clear. When it did, I saw the heavy brown body oozing out of the bank toward me. A chill played the full length of my spine. Then I realized the movement was involuntary, a death reflex. For there was a gaping wound in the head. I had ended it.

My knees were like rubber. I was sweating and felt nauseous. I climbed out and collapsed on a rock and sat for a long time looking at the big snake lying there in the creek. It was the first time in my life I had ever known blood-thickening fear and I would not soon forget it.

More than any other I can remember, that summer was a peerless collage of adventure from beginning to end. Would that it never had to end. But August wore on into the first days of September. And abruptly, we were facing school again.

We ended the season with a wienie roast. On the creek, of course, at the big pool below the Coble House. The whole family was there, family by blood or friendship. While the grown-ups built the fire and talked, we scoured the woods for good roasting sticks. The two pronged ones were all right, but you tried for three when you were cutting for yourself. When marshmallow time came, you would be ahead. We caught mussels from the creek and we went swimming for the last time as free agents. Tommy's mama had to burn a leech off a delicate spot with a cigarette and the kidding he took was worse than the bloodletting. Everybody got tired after a while and settled in close to the fire. We ate and sat around past dark watching the coals smolder in the gathering stillness. Somewhere down the creek a big owl whooped.

It was Sunday and there's a gnawing loneliness in Sunday. We felt it, young and old alike, and were glad to be together to stave it off for a few hours. I had to start the sixth grade the next day. We would listen to Mrs. Lancaster tell us not to talk or look out the window, and to march in a straight line. I thought about the big owl down the creek. I thought about the leopard frog, and the shellcracker, and the two snakes at the bridge. And I knew where my heart would be.

An Insect *Rip Van Winkle*

The 17-year locust is really a cicada, and its life history is one of the most amazing in nature.

written and photographed by Harry Ellis

Almost every spring in some part of the eastern United States, there is an emerging brood of periodical or seventeen-year cicadas. At Plymouth, Massachusetts, in the year 1634, the Pilgrims were frightened by the vast swarms of strange insects that they saw coming out of the earth and concluded that a locust plague was upon them, like the one sent upon the Pharaohs of ancient Egypt. Even the insect's eerie wailing calls in the forest seemed to be a long-drawn crying of "Ph-a-a-a-raoh!" So they called the emerging cicadas, "locusts" and although they look nothing like true locusts — which are migratory grasshoppers — the name has stuck with them, and most people to this day call them "seventeen-year locusts."

Of the many hundreds of thousands of insects that have been described and catalogued by scientists, none have a stranger or more fascinating life history. The adult is a large stout-bodied insect, black with orange trim, fiery red eyes, and large, veined transparent wings that seem to bear near the tip of each a veining pattern suggesting the letter "W," which the superstitious see as an omen of approaching War. The most extraordinary aspect of the life of the seventeen-year cicada is its long existence in the immature stage of its life, spending years buried in earth darkness and holding the record for insect longevity. It is a Methuselah among insects. In some parts of the south, especially the Mississippi Valley, a form occurs with a 13-year life cycle.

Each synchronized or coherent population emerging in the same year is called a brood. Entomologists presently recognize 14 specific broods of the 17-year form and five of the 13-year form. As there is some overlapping in the distribution of the different broods, we often see a few individuals during normal off-years.

Eight broods appear in the state of North Carolina, but some are small and of little importance. Brood X, the largest and most widespread of all seventeen-year cicada broods, is due to appear in 1987 from Vermont to Georgia, including North Carolina. Brood II emerged in 1979 from central and Western North Carolina to the Hudson Valley in New York. Brood XIV appeared in 1974 from New England to the southern Appalachians, with a heavy emergence in western North Carolina, and will reappear in 1991. Of the 13-year form, the only brood of any consequence is brood XIX. It occurred sporadically over parts of North Carolina in 1980.

One year during the month of June, in an oak grove in the Blue Ridge Mountains of North Carolina, I watched and photographed the emergence and activities of a brood of seventeen-year cicadas *(Magicicada septendecim)* in numbers beyond calculation. Throughout the woodlands, the ground was honeycombed with the nymphs' half-inch emergence-holes, and cast-off nymphal shells hung by thousands from trees and bushes and lay in piles over the ground. The sound of the mating adult males, produced by the rapid vibration of drum-like membranes on the abdomen, became an almost deafening roar in the treetops, like a hundred power saws all going at once.

After emerging from its nymphal shuck (left), the cicada is ghostly white with red eyes, but its color will darken to that of a typical adult within a few hours. Cicadas deposit their eggs in cavities in living twigs, causing the outer leaves to die (above); however, no permanent damage is done to trees. Brown-tipped trees are a common sight in summers where cicadas hatch in great numbers.

When the pinhead-sized cicada nymph hatches from an egg laid in the cavity of a twig or tree branch, it drops to the ground and burrows deep into the soft, damp earth, a place that will be its home for many years to come. Sucking sap from tree roots, molting from time to time as the seasons pass, and slowly growing a little larger, it lives out its years devoid of sight or sound, in a state of dim awareness. A year passes, and another, and then many more.

In the world outside, as year follows year, seedlings grow into tall trees, wars come and go, presidents are elected, and students in the first grade become grown men and women, but this passage of time makes no impact on the cicada nymph in its dark subterranean universe. One by one 16 springs come and go, with still no sign of response.

And then, in the seventeenth spring, the nymph, and millions of others like it, is stirred by an irresistible instinct to move upward toward the world of sunlight that it left so very long ago, and with its powerful foreclaws begins digging upward. How cicada nymphs "count" the years, no man can say. It is as if some mysterious "alarm clock" had spread a signal through the underground, as thousands swarm out of the ground almost simultaneously.

When the brown, shiny-bodied nymph breaks through the earth, it crawls laboriously to the nearest upright support — a tree, log or fence post. In preparation for its metamorphosis to an adult, it firmly anchors itself with its claws, and within minutes the skin splits down its back as if a zipper had been opened, revealing a creamy-white back with jet-black shoulder patches. As the slit widens, the adult cicada slowly emerges, pausing several times to rest before it finally breaks free from the nymphal shell. The newly transformed cicada is a soft, ghostly-looking creature with red eyes that glow like embers and tiny wing pads that in a few minutes expand to large transparent wings. Within a few hours, the color darkens to that of a mature adult.

But after spending so long blindly groping in darkness, the periodical cicada now has a total maturity of only a few days — a few days to sing and mate and lay its eggs before it dies. Within a week after becoming an adult, the female begins to lay her eggs in twigs and small branches of deciduous trees, using her saw-like ovipositor to pierce the bark and make pockets for the eggs. She makes a row of punctures in a twig, where 20 to 30 eggs are placed, repeating the process on other twigs and small branches until a total of 500 or 600 have been laid. The twigs wilt and die, but the damage to the trees is usually only temporary.

The adult cicadas are clumsy fliers and easy prey to a host of enemies. Birds in the treetops feast on them. Skunks, squirrels, and other small mammals relish them. The female cicada killer *(Sphecius speciosus)*, a large black and yellow digger wasp, captures both annual and periodical cicadas. The victim is paralyzed by a formidable sting and carried to the nest where an egg is laid on its body, and the cell sealed with fresh earth, providing an ample supply of food for the young wasp when it hatches.

In the shimmering heat, the female cicada lays her last batch of eggs and falls to the ground and dies. The rasping drone of the males grows less and less and finally ceases altogether. Now a month after it all began, it is all over. The strange story of the seventeen-year cicada has come to an end.

But overhead throughout the forests, white puncture marks in twigs and branches tell us that millions of eggs are packed safely inside these cavities, waiting to hatch, and that nearly two decades hence, with the coming of a certain seventeenth spring, the cicada hordes will again come forth and repeat the age-old cycle of mating, reproduction and growth, the events that make up the life story of the seventeen-year cicada.

Cicada nymphs leave numerous half-inch holes in the ground where they have spent most of their life, then emerge through a split in the nymphal shell. As adults, they survive only a few days singing and mating in treetops. The cicada killer wasp (above) captures a cicada which will be placed in the wasp's burrow to provide food for its young.

The Art of Nature Painting

Handsome prints of fish and other natural objects are easy to make by this ancient process.

by Lawrence S. Earley
paintings by Sally Nunnally

Sally Nunnally's lovely pictures on these pages may look like the work of an accomplished artist, and she'd be delighted if you called her that. But she'd be the first to tell you that she didn't draw her flounders and sea bass and flowers, and that her artistry consists in the subtle touches of color she added to a picture that was obtained almost mechanically.

Indeed, the principle is simple: if you coat an object with ink and press paper against it, an impression of the object will be left behind. Gutenberg knew all about this principle, of course: his printing press was based on it. But others have used it to obtain different results, men like Leonardo da Vinci, for example, and Benjamin Franklin, both early practicioners of nature painting. Nineteenth-century botanists used the method to illustrate their books. And Japanese sports fishermen have been practicing the art for over a century as proof of how big that fish really was.

It's called nature printing most of the time. *Gyotaku* is the traditional term used when you're making fish prints (from the Japanese words *Gyo,* or fish, plus *taku,* or rubbing). But whatever you call it, it's fast becoming a popular hobby, educational tool, and art form. Sally Nunnally has been involved in all three uses.

"I first got involved with nature printing four years ago, when I came to the Marine Resources Center here at Fort Fisher. It grew out of my educational activities, but gradually it's become an avocation with me." Although she's had some prints exhibited and others published, she's interested currently in perfecting the advanced techniques of a master printer. "I want to work with some of the natural objects and animals that are harder to print," she says.

In her job as Educational Coordinator at the Marine Resources Center at Fort Fisher, Sally has discovered that nature printing is a great way for kids to learn things about fish and natural forms. "If you're handling and washing and coating a thing, you're going to get a closer look at it and therefore you can begin to think about why things are the way they are.

"Take flounder, for example, Why are they flat? This is a question that kids sometimes begin to ask themselves. They're flat because they are bottom dwellers. Kids handle the fish, and open its

The delicate colors of this pair of lookdown show the artistry that nature printing can aspire to. Another name for nature printing is gyotaku, *a Japanese word traditionally used to describe prints made from fish.*

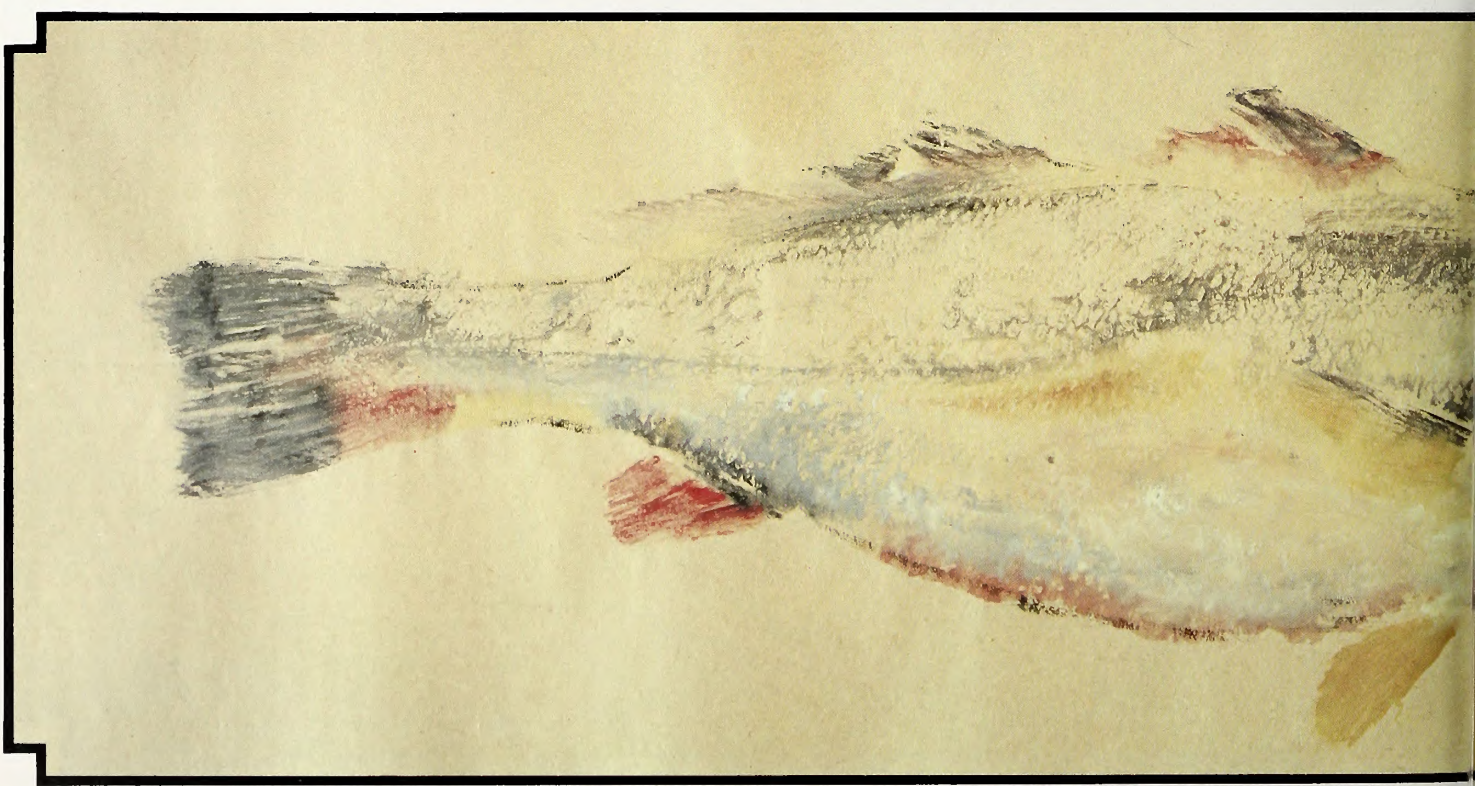
S. NUNNALLY

mouth, and ask — why would an animal have such sharp, nasty-looking teeth?"

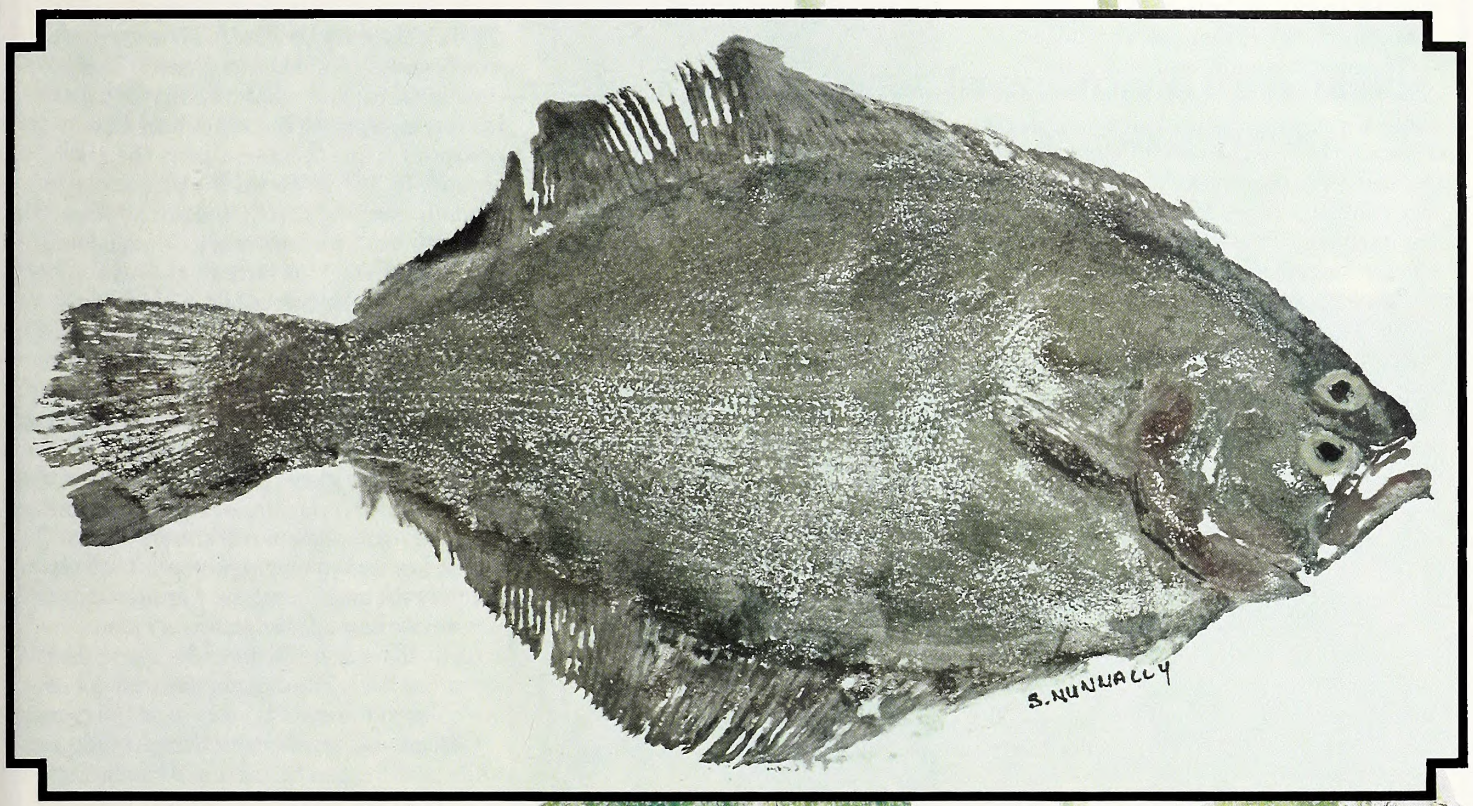
But the educational value of nature printing goes beyond learning about its physical structure, says Sally. "You can talk about the habitat the creatures live in, how they relate to other organisms — ecology, how things fit together."

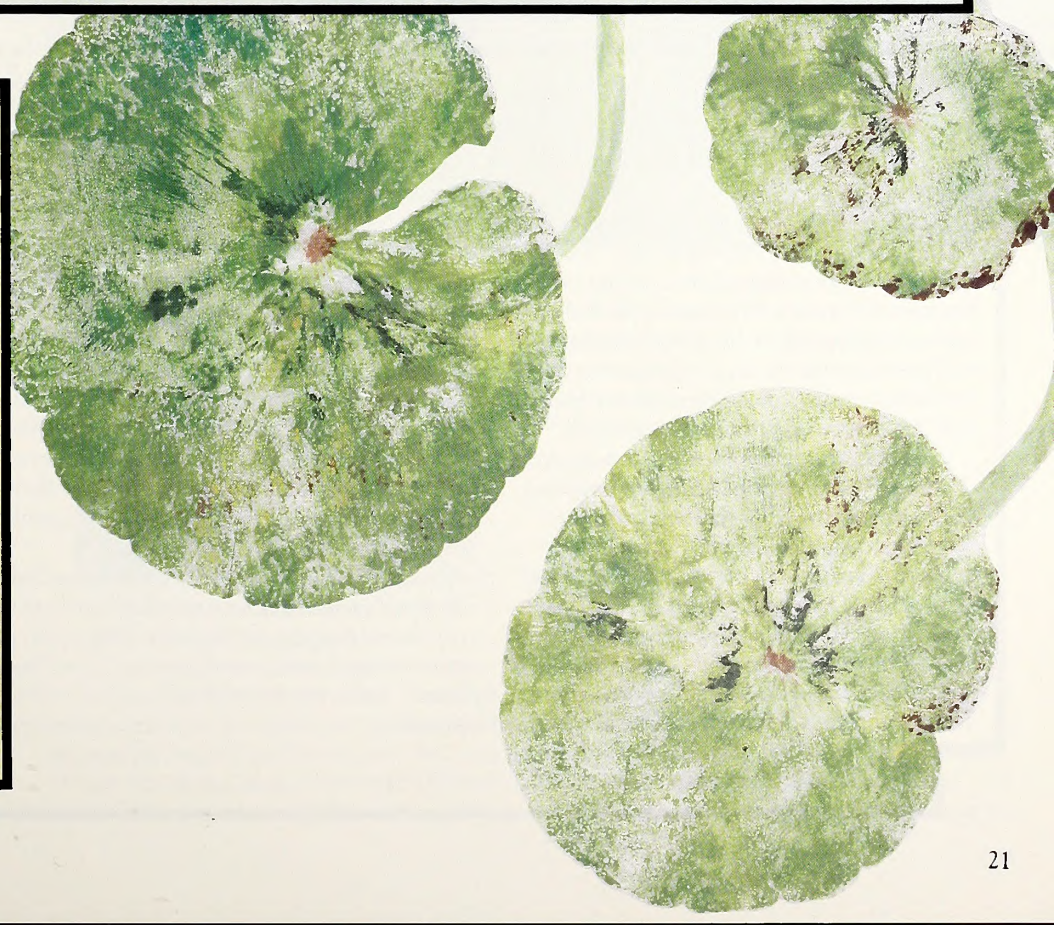
Nature prints are also tremendous learning tools because they have a fidelity, a faithfulness to the original, that even photographs sometimes can't touch. Every row of scales and every vein in a leaf is clearly marked. "Just looking at this flounder, for example, most people won't notice its lateral line. But on the print it's pretty obvious and on other kinds of fish it stands out, too. Sometimes the colors of an object obscure details that are only brought out in a print."

There are basically two types of nature printing, or *gyotaku*, as Sally Nunnally



Sally Nunnally (facing page) has made prints from many natural objects and animals, including the Indian blanket (left), the Spanish mackerel (below left), the flounder (below) and the pennyswort. If water-based inks are used, you can wash them off and eat your fish!





prefers to call it. One is the direct method, the most common, in which the printer applies ink onto the object, and paper is pressed against the coated object. With the indirect method, the artist presses paper against the object, and applies ink to the side not in contact with it. A likeness is obtained, rather than a mirror image.

The most common approach is the direct method, and that was the technique Sally demonstrated one afternoon at Fort Fisher. "The most important thing in *gyotaku* is the preparation," she said. "It's like cooking a huge, 15-course meal — you eat it in about 15 minutes. In fish printing, the printing takes only a few seconds; it's the preparation that counts."

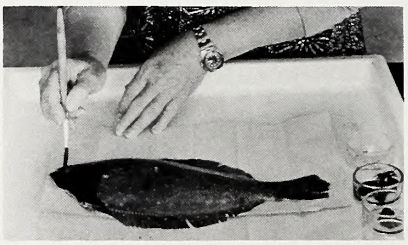
The first thing she did was to take a fresh, ungutted and unscaled flounder and give it a bath. She used a household detergent to remove the mucous coating. "For beginners, the flatter the object the better. That's why flounder are so ideally suited to this. You need a little bit of practice before you do something that is round in form," she said.

The next step was to dry the fish thoroughly with paper towels, pressing rather than rubbing so that the moisture was absorbed. Placing the dried fish on paper towels, she turned to her paints. "A particularly effective ink for *gyotaku* is water-based block-printing ink because it's easier to clean up. You can buy small tubes at art supply stores. There's also oil-based block-printing ink for special applications. One nice thing about using water-based ink, is that you can wash it off the fish. That way you can have your fish and eat it, too."

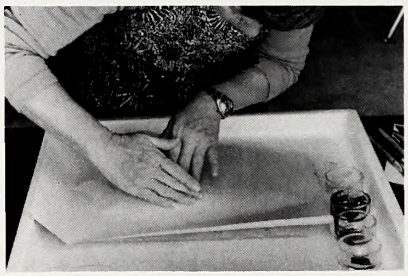
She uses soft, water color brushes. "They don't have to be expensive, but they shouldn't be too inexpensive, either, because the inexpensive ones will shed. If you use a very stiff brush it leaves streaks, so I use a soft brush, and I always wet the brush and then shake the excess water out of it before I dip it into the color."

She placed dabs of several colors in small dishes, and began to spread black ink over the fish, starting from the head and working toward the tail. "Traditional prints are made with just a black ink. One of the mistakes a beginner makes is to coat the fish too heavily with ink. It should have a nice, even coat. It's almost better not to coat some areas than to get too much on because it'll make a sloppy print

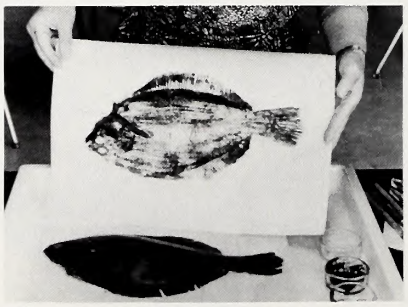
Only a few items are necessary for nature printing: a flat tray, cans or tubes of different colored inks, soft water-color brushes, small jars to hold the inks, paper napkins and rollers.



After the fish is washed and patted dry, a light coating of ink is applied from the head to the tail of the flounder.



Newsprint is gently pressed against the inked fish. One hand holds the paper still, while the other presses it onto every part of the fish where there is ink.



The print is pulled up, leaving behind a crisp mirror image of the flounder. The same technique can be used to print flowers, shells, or other marine animals.

— it won't be sharp and clear. You don't have to cover every part of the fish, and you avoid covering the eyes. They are painted in later."

After daubing the flounder with black ink, Sally added touches of red and yellow to the fins and lateral area "to give it some depth." She took up a piece of newsprint which would take the impression. "The traditional paper is what we call rice paper. It's very expensive. But something like newsprint is fine because it takes the ink beautifully." She lowered the paper carefully onto the fish, holding it in place with one hand while fitting it around every part of the fish. "You have to work the paper around the curves of the object or animal and be sure to press with the hands and rub everywhere you put the ink so you get a complete print. Often the beginner leaves the print too long, so I'm going to pick it up quickly." As she pulled her *gyotaku*, a crisp image of the flounder was left. Rows of overlapping scales looked like the chain mail of medieval armor.

The last step in making the print was to put the eyes in. "One thing you should do is to study the way the fishes' eyes are actually shaped. In the flounder's case they are rather oval. You can put in just a dot of raw color in the eye."

Objects, like shells, which might slide while printing can be anchored by seating them in a clay "cradle." Paint is applied to the now-stationary shell and the print pulled in much the same way as with the flounder. "The fun thing about printing shells is that you're going to get only the planes or the ribs of the shell; you're not going to get down in the cracks and crevices. You can get interesting effects."

Everyone feels like an artist when he pulls his first nature print. The startling clarity of a fish's fins or scales, or the fidelity of a bird's feather when inked and pressed against paper can make even an advanced printer like Sally Nunnally pleased. But she is especially happy watching others react to their work. Learning-disabled people have responded with proud grins at a print they've made.

"For them especially it's great," says Sally, "because many of them can't envision how they could make something so nice. They have no idea how you get from a blank sheet of paper to a piece of art. And when they finish it, you can see it written all over their face. 'I did this!' "

Snapper!

Snapping turtles have been around for a million years, but we still know little about them.

written and photographed by Terry Shankle

"But he doesn't bite underwater!" John Foil was trying to reassure me as I looked at the business end of a 30-pound snapping turtle through the lens of a 35mm camera. As a turtle researcher with hundreds of hours of experience with snappers, John knew what he was talking about, but just the same I wasn't taking any chances. Who wouldn't respect the snapper, with its intimidating appearance and its fierce bite? A broom handle would have about as much of a chance in its jaws as warm butter under a hot knife — and my fingers are a lot softer than a broom handle.

Snapping turtles had intrigued me long before I finally got up with John Foil. Where I live, it's quite common to hear people describe a snapper that was "as big as a washtub." Often the turtles are sighted in summer by fishermen who frequent the thousands of farm ponds in North Carolina. But they are also seen in large reservoirs, crossing highways, and in backyards. I was curious about why they grew so big, and why they were seen in so many different places.

The problem is the snapper is a shy creature that lives in water, and so scientific inquiry has been slow to develop. There just isn't a lot of information in scientific books about the snapper's life cycle. By the time I had found out that the snapper has been around for millions of years, I had just about exhausted the stock of general information.

I turned for help to Dr. Peter Weigl, Professor of Biology at Wake Forest University. He told me about John Foil, a Wake Forest doctoral student who had done extensive research on the snapping turtle. In presenting several papers and seminars before biological professional groups, John had turned many heads in the scientific community with his knowledge of snappers. According to Dr. Weigl, "John has probably accumulated more research information on the behavior of the snapping turtle than anyone else."

Two phone calls later, I was talking to John on his family's dairy farm near Mt. Pleasant in Cabarrus County. Ponds for watering cows dot the farm and are perfect for John's turtle research. Large galvanized cattle waterers holding captive turtles crowd the foundation of the warm south side of the farmhouse.

John's turtle research actually began when he was a small child. "I've always been interested in all types of wild creatures," he said as he dug both hands into the murky waters of a cattle waterer. "When I was younger I often went along with older men in the community when they caught snapping turtles and that led to my studying biology in college. Later, when I started considering working towards a doctorate, snapping turtles were the most obvious way to go since I had such a strong background in that area already." As he pulled a 25-pound snapper from the waterer, John started to explain some of the things he's learned.

John believes that male dominance is one of the greatest factors in the snapping turtle's existence. Each of the hundreds of ponds he's studied seems to have a dominant male who is the largest snapper in the pond and "rules the roost." In larger bodies of water the dominant males appear to establish individual territories. Because of their size these large males take the best food available and establish dominance over smaller males entering their domain. These large males are often the "big as a washtub" turtles. Large snapping turtles have reached a wild weight of 68 pounds and a well-fed 80 pounds in captivity. "Most turtles that humans have contact with are in the 5- to 20-pound range," John explained, "since that size turtle makes up the bulk of the snapping turtle population." While the snapper grows much larger than other native N.C. turtles such as the pond slider and the painted turtle, his size seems small when compared to the alligator snapper common to the Mississippi River Valley that can exceed 200 pounds in weight.

Snapping turtles not only live in ponds and reservoirs but in creeks and rivers. They also move between bodies of water to

find safe places to lay eggs, refuge from fights, or high water, food, and mates. Perhaps this helps explain some of the snapping turtles found in roadways, backyards, and other strange places.

John has found that turtles are very opportunistic, especially where meat, their favorite food, is concerned. This often irritates fishermen who have stringers of fish ruined by a hungry snapper. There seems to be no evidence, however, that snapping turtles damage the fish resources in a body of water since the fish they eat are usually disabled, diseased, or already dead. Snapping turtles will gorge themselves at an abundant food source and will eat until the food literally sticks out of their mouths. Snapping turtles love to eat baby ducks and this habit has not helped their reputation. They also frequent fish hatcheries where fish are concentrated and offer an abundant food source. Here they become entangled in and damage the nets used to catch the fish.

"I've assisted several Piedmont area minnow and goldfish hatcheries in removing turtles from their ponds." John explained. "Using a basket trap I can usually catch all the turtles in a pond in three or four days." Turtles can apparently find food by smell and seem able to find food even in distant ponds by following the smell up discharge pipes and spillways. "The olfactory process or sense of smell, in snapping turtles seems to be tremendous" John added, "and is an area where much research could be done."

John has found one other interesting fact about snapping turtles' eating habits. They can live for up to two years without food and even then still have large amounts of body fat. "Cleaning out" is a term often used to describe feeding a captive turtle table scraps in order to improve the flavor of the meat. This practice seems to be widespread in North Carolina. John has tried this method but he favors simply not feeding turtles for a week or so before dressing them. During this period he regularly changes the water the turtles are confined to. This method works best if the natural flavor of turtle meat is desired.

Snapping turtles are best known for their "snap," a very sobering sight indeed. This instinct develops early because embryos still in the shell display snapping ability.

How do you hold a snapper? Carefully . . . but taking it by the tail may be the best bet. Like alligators, the muscles that close the snapper's jaws are more powerful than the ones that open them. Two fingers (above) may be all that's necessary to keep the snapper's mouth shut.

Snapping turtles can strike down as well as to the left and right. They cannot strike back over the front edge of their shell and aren't known to strike while submerged except when feeding. John explains the snapper's more docile conduct underwater this way. "Underwater, the snapping turtle is in its natural environment where it has no enemies. Because of this it has no fear and isn't nearly as aggressive as it is on land."

Snapping turtles also have a characteristic common to alligators: the muscles that snap their sharp-edged mouths shut are much stronger than the muscles which open the jaws. "Two or three fingers are usually all that's needed to keep even a large turtle's mouth closed," John explained as he grasped the jaws of the 25-pounder he had placed in a stupor by laying the turtle on its back. As John turned the turtle over and it regained its senses, it was quite obvious the snapper was unable to open its mouth.

The overlapping jaws of the snapper are used not only for defense but for grasping food which is then held by the strong front claws while chunks are bitten off for swallowing. The much repeated story of a snapping turtle's severed head still being able to snap is true. "I was bitten once by a severed head 30 minutes after it was cut off," John recalled, "and was caught totally by surprise." He suggests totally avoiding a severed head, and to be sure to take precautions if children and pets are in the area. Another often told tale about a snapping turtle's bite is that the turtle will not let go until it thunders. "That's definitely a tale," says John, "but it stems from the fact that once a snapping turtle bites down on any object, he takes his own good time turning loose. You can be bitten however, even by a large snapper, without being seriously injured. Injuries occur when the person who's bitten attempts to jerk free from the turtle. At the same time, the strong retractor muscles that pull the turtle's head back into the shell are at work in the opposite direction. The jerking causes more damage to the skin tissue than the actual pressure from the jaws."

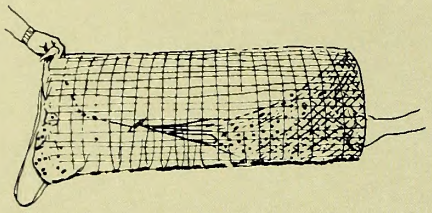
Having been bitten several times, John has learned to resist the urge to jerk away. He instead lets the turtle keep hold of his finger or hand. The turtle will usually release its hold in a few minutes. If this technique fails to get results, John's next step is to pry the jaws apart using a screwdriver or similar tool. Don't use a knife in order to avoid the chance of even further injury.

I wasn't terribly interested in trying John's release techniques on my own fingers and neither was he. John is a hemophiliac and a severe bite could result in bleeding problems and worse yet, an infection. This condition led to his learning not to jerk away when bitten. It has also caused him to be cautious when handling turtles. Several years ago the hemophilia caused John to undergo a complete replacement of his right knee with an artificial joint. The intense pain and long hospital stays have hindered John in compiling the research data for his doctoral thesis. "At times I've considered throwing in the towel," John remembered, "but then I started thinking of all the research I've gathered and realize what a shame it would be if it's never compiled and presented in such a manner that other biologists can use the information. I also hope that the research can be used to better educate the public about the snapping turtle. This could also lead to better management of the turtle as a renewable resource."

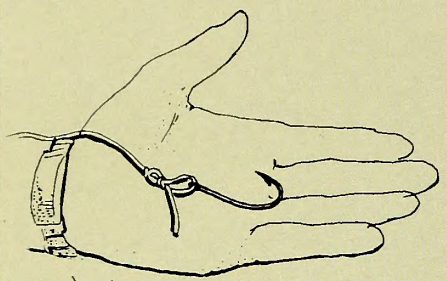
Some of the best-kept snapping turtle

Catching and Preparing Snappers

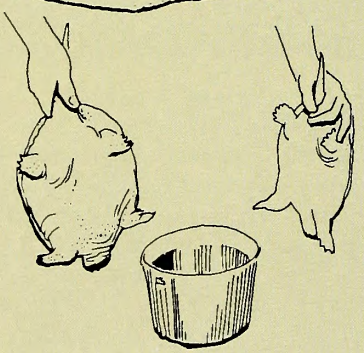
Turtle stew made from a North Carolina snapper is a Tar Heel favorite, but first you've got to catch it. Turtle baskets and baited hooks are the most popular methods.



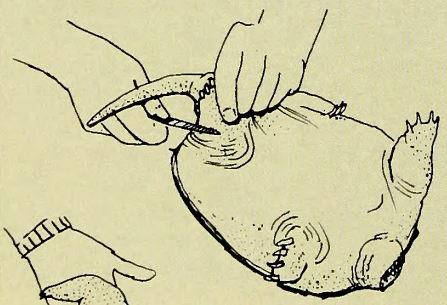
A turtle basket is made of welded wire with a funnel-shaped entrance. The basket is baited with meat, and placed in a pond where it should face towards deep water. In a stream the basket should face downstream.



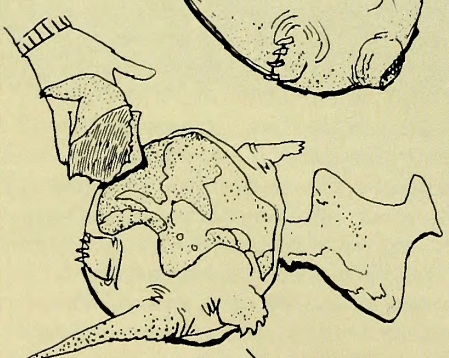
You can also use a 6/0 hook tied to 4-foot lengths of nylon mason's string with the ends burned to prevent unraveling. Chunks of tough meat are the best bait. For stream turtles, set hooks in the deeper, slower moving holes of water with undercut banks and numerous tree roots. Small strips of cloth tied above each set mark it for easy finding the next day.



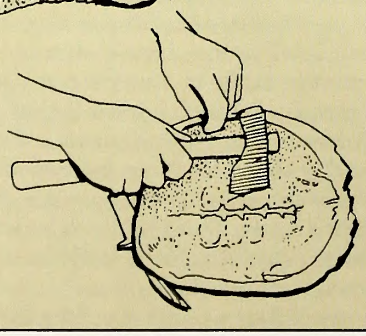
To prepare the turtle for cooking, sever the head and place the turtle into a pot of boiling water for one to two minutes or until the outermost dark skin begins to peel off. (Do not place a live turtle into boiling water.)



When the skin loosens, scrape and rub off all the outer skin on the neck, legs, and tail. When the skin is nearly white, you're finished.

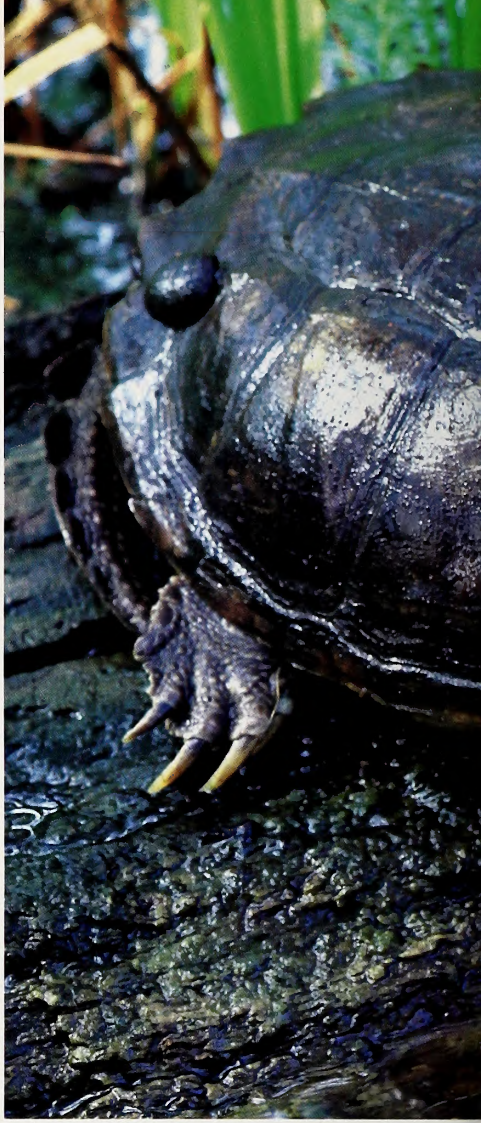


Remove the entire bottom shell, and cut the front legs and neck free from the shell, and then the hind legs and tail. Avoid cutting into the intestines.



Tasty tenderloin meat is found at the top inside of the shell. It can be removed only from larger snappers by cracking the bones protecting it with a hatchet, and then removing the meat with a knife.

The final step is to soak the meat in medium to strong saltwater for at least 24 hours. The meat is now ready for cooking or freezing.



Jack Dermid

John Foil's research on snapping turtles has turned up important new information. He's found that the washtub-sized snappers are the dominant males in a pond or reservoir. Snappers can also live up to two years without food and still have body fat.!

secrets are their breeding habits. First, it's only by close observation that the sex of a snapping turtle can be determined by the distance of the sexual opening at the base of the tail from the edge of the shell. The opening, or cloaca, of a mature female is very close to the shell, while the cloaca of a mature male is farther towards the tip of the tail. There are members of the scientific community who have recorded numerous sightings of two turtles rolling near the water's surface, one apparently holding to the top of the other one. They dismissed the sightings as "unexplainable aggressive or sexual behavior." John's research leads him to believe that snapping turtles breed belly to belly due to the position of the cloaca on sexually mature males and females. His observations of pairs of turtles locked together one on top of the other have always proved to be male turtles fighting. "These fighting males are often the pond's dominant male on top with an intruder or subordinate male underneath," John says. "As the smaller turtle is pushed underwater he sticks his head up for air and is quickly bitten and sometimes killed by the larger turtle on top." These battles are sometimes so intense that the combatants often become totally unaware of their surroundings and have sometimes been captured by fishermen using landing nets. "Scars are often left on the turtles," John explained, pointing out scars on several captive snappers that were slowly crawling around in the brown December grass.

Snapping turtles nest in the spring and female snappers lay their eggs in carefully selected places on land to prevent their nests from being destroyed by predators. They also choose nest sites that will utilize the sun's heat to incubate the eggs in 70 to 120 days. Small hatchlings seek streams and often remain there until just before sexual maturity which, John believes, comes in about four or five years. Over 80 ping-pong sized eggs have been found in a clutch, although clutches average 30. Turtle mortality is high. The nests themselves are often destroyed by raccoons, foxes, skunks, and mink while the hatchlings become food for these same animals as well as for large birds, fish, alligators, and other turtles. Upon reaching maturity, however, snapping turtles have no enemies other than man. Few animals will take on the formidable jaws and hard shell. Even then snappers have one other defense which is a foul, musky odor emitted by glands in the bridge area between the upper shell (carapace) and the lower shell (plastron).

Using the snapping turtle for food and profit is both a historical and present-day fact of life and here lies John Foil's main concern for the future of snapping turtles. Economically speaking, turtles are the most valuable reptiles world wide. Their meat is eaten widely and is often considered a delicacy. In North Carolina, snapping turtles are eaten by many people and can be purchased at some fish markets. John's concern isn't that snappers will become endangered but that, "in any given area too many can be removed so as to affect that local population for years to come." Old-timers have told John of times when heavy basket-trapping pressure greatly reduced snapping turtle populations in areas of the Yadkin River basin. John believes that turtles can and should be managed as a resource. His research shows that a large majority of nests are destroyed by predators.

With this in mind, mature animals capable of reproduction need to be closely scrutinized when captured. Learning to distinguish between male and female would ensure a healthy turtle population if large, mature females were released. "People can get into turtle management in their own small way," John concluded. "If a female snapping turtle is dressed and well-developed eggs are found inside her, they can be hatched if covered with moist sand inside a container with drain holes. Keep the sand moist and the container inside a garage or shed. Place screen wire over the top to keep any hatchlings from escaping and release them in shallow water in a pond or stream."

There are no North Carolina laws regulating the catching of snapping turtles. The snapper's nasty disposition and overall life cycle make it unlikely that this primitive repitle will be of great concern to lawmakers. That is unless they come in contact with John Foil, whose dedication to a subject as cold-blooded as snapping turtles is indeed heartwarming.

EQI Down

Bad News On The Environmental Front

Written and Edited by Mark Taylor

With massive federal budget cuts threatening the enforcement of environmental laws, our nation's natural resources are struggling to hold their own. This is the conclusion of the National Wildlife Federation's 1982 Environmental Quality Index which uses seven natural resources as indicators of the health of our environment.

According to the 15th annual index, resource conditions remained the same or worsened during 1982. In fact, the index has not shown an overall improvement since 1979.

The biggest problem expressed through the index was the weakening of federal environmental standards through the elimination of programs or budget cuts. In 1982, for example, the Environmental Protection Agency — the watchdog for environmental regulations — had its budget cut by a third and its staff reduced by 25 percent. However, 1982 also saw some gains on the environmental front. The Endangered Species Act was reauthorized by Congress, legislation was passed protecting coastal barrier islands, and plans by the Department of Interior to expand energy development and mineral leasing in wilderness areas met overwhelming opposition.

The quality of seven natural resources, as estimated by the Index, is as follows:

Wildlife stayed the same as in 1981. Although Congress reauthorized the Endangered Species Act — a major victory for conservationists — the Army Corps of Engineers sought to weaken Section 404 of the Clean Water Act, which protects wetland habitat. Chemical contamination also threatened some wildlife. High levels of the pesticide endrin were found in waterfowl and some upland birds, and PCB contamination in fish and shellfish continues to be a problem.

Air quality stayed the same. In 23 major cities, six years of pollution controls have cut the number of days when breathing is unhealthy by 39 percent. In Congress, however, no compromise has been reached on the reauthorization of the Clean Air Act — perhaps the single most important environmental issue today. A strong Clean Air Act is essential to curb acid rain, which has killed thousands of lakes in the United States and Canada.

Water quality has worsened. Federal funds to build and upgrade sewage treatment plants have been cut, and 37 states report that they won't be able to meet the Clean Water Act's goal of making all of America's waters "fishable and swimmable" by 1983. Controversy over the ocean dumping of sludge continues, and the National Wildlife Federation has sued six municipalities for dumping contaminated sludge in the Atlantic Ocean.

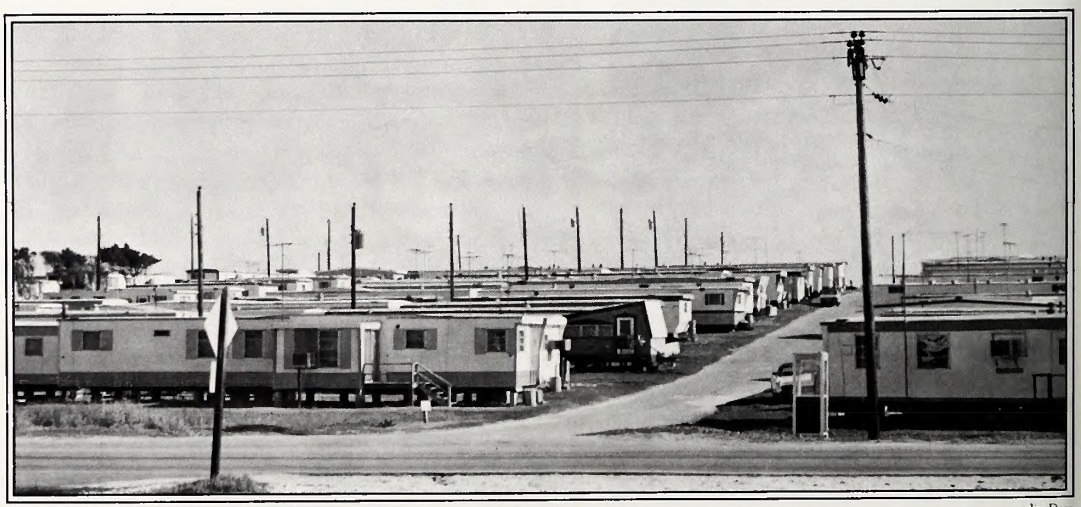
Minerals have stayed the same. Yet, with home heating oil supplies plentiful and prices stable, the Department of Interior staged the nation's biggest coal lease in the Power River basin of Montana and Wyoming, and also announced a plan to offer oil and gas leases throughout one billion acres of the Outer Continental Shelf — including tracts near the coast of North Carolina.

Soil has worsened. America is in the midst of an erosion crisis, and fertile topsoil is being washed or blown off farm land at the rate of 513 million tons per year.

Forests are the same. A faltering economy has kept the demand for forest products at near record lows, although the U.S. Forest Service has been directed to increase the harvest of timber on all national forests.

Living space is worse. The federal administration has proposed a massive sale of federal lands — including the Uwharrie National Forest — to balance the federal budget. Also, parkland acquisitions were curtailed drastically in 1982, and development around existing parks threatens air and water quality within these areas.

A free reprint of the 1982 National Environmental Quality Index is available from the National Wildlife Federation, Educational Services, 1412 16th St. NW, Washington, D.C. 20036.



Jim Dean

Slip-Sliding Away: *Living space is one of the factors which showed a decline in the 1982 Environmental Quality Index, conducted annually by the National Wildlife Federation. On the state and federal levels, programs which encouraged sound land-use planning — like the Coastal Area Management Act which regulates development in sensitive coastal areas — came under attack.*

Better Habitat The Key

Rabbit Stocking Not The Answer

"Ask a Biologist" is a series of articles on wildlife management that appears regularly in *Wildlife In North Carolina.* The author is Carl Betsill, a Wildlife Commission biologist who specializes in the management of small game and urban wildlife.

Jim Dean

No Easy Answers: *Many hunters feel that rabbit populations have declined in recent years, and some feel that stocking rabbits is the answer. Studies have shown, however, that stocking rabbits is largely an exercise in futility. The best way to boost rabbit numbers is to improve the quality of the habitat.*

Question: Rabbit populations seem to be low on my farm. Would stocking rabbits help build up populations?

The apparent decline in rabbit numbers over the past several years has led many rabbit hunters to wonder what might be done to solve this problem. Some have been stocking cottontails imported from the mid-West, and have suggested that the Wildlife Commission aid in these stocking efforts. Biologists working for the Wildlife Commission, however, unanimously agree that stocking is not the solution to low rabbit populations. In fact, there is even some evidence indicating that importing rabbits is part of the problem.

In the first place, importing rabbits from other states increases the chances of die-offs from tularemia — also called rabbit fever — in areas where the rabbits are stocked. Often, imported rabbits carry the disease and infect native rabbits. Indeed, a study sponsored by the Virginia Game Commission indicated that tularemia may keep rabbit populations at a low level for a number of years. Also, it is illegal to import wildlife into North Carolina without a permit.

Aside from disease problems, why is stocking rabbits a poor idea? After all, if there aren't many rabbits on your land, it would seem logical that you could remedy this by adding some. That approach doesn't work, though, because it treats a symptom rather than the cause of the problem. Low rabbit populations are a symptom telling us that something is wrong — usually with the habitat. Everyone is aware of a rabbit's reputation for prolific reproduction. One doe will have a litter of three or four bunnies every 28 days from mid-March through August or September. In some areas, rabbits born in March can even bear a litter by late summer or early fall. In fact, if we eliminated death, we could start with two rabbits and have one rabbit per square foot over the entire surface of the Earth in less than 16 years! So, given the rabbit's potential for reproduction, it's obvious that if we have proper habitat, the few rabbits already present will soon fill it. And rabbits stocked into poor habitat have even lower chances of survival than native rabbits.

Yet, what about the rabbits that are stocked in enclosures for beagle field trial clubs? These areas are often chock-full of rabbits! While it's true that artificially high rabbit populations can be maintained temporarily within an enclosure, this solution seldom lasts. Remember that 70 to 80 percent of the wild rabbits in a native population die and are replaced by reproduction each year. If you don't improve the habitat so that it will support a high population of rabbits, restocking the area will become an annual chore. If you do choose this route, biologists suggest that you use local box-trapped rabbits.

The best way to increase rabbit populations — in all areas — is to improve the habitat. Take a look at the land — is there plenty of cover? There may be adequate cover during the hunting season but if there is a lack of cover in late winter, this could be limiting the population. A lack of nesting areas may also be a problem. If prime nesting sites have been eliminated by modern farming practices, rabbits may be forced to nest in low, wet areas that can't be farmed. Often, litters of young rabbits drown in these areas. How can you find out what factor is limiting rabbit populations on your land, and take steps to correct the problem? The best solution is to contact one of the nine Commission wildlife biologists who are stationed throughout the State. These biologists will be happy to look at your land, and make suggestions on habitat improvements. To contact the biologist in your area, talk to your local wildlife enforcement officer or call the Wildlife Commission's toll-free, 24-hour Wildlife Watch hotline at 1-800-662-7137. This assistance is provided free, and is made possible through the purchase of hunting and fishing licenses.

Jordan Reservoir Looking Good

Looking For Good Summer Fishing?

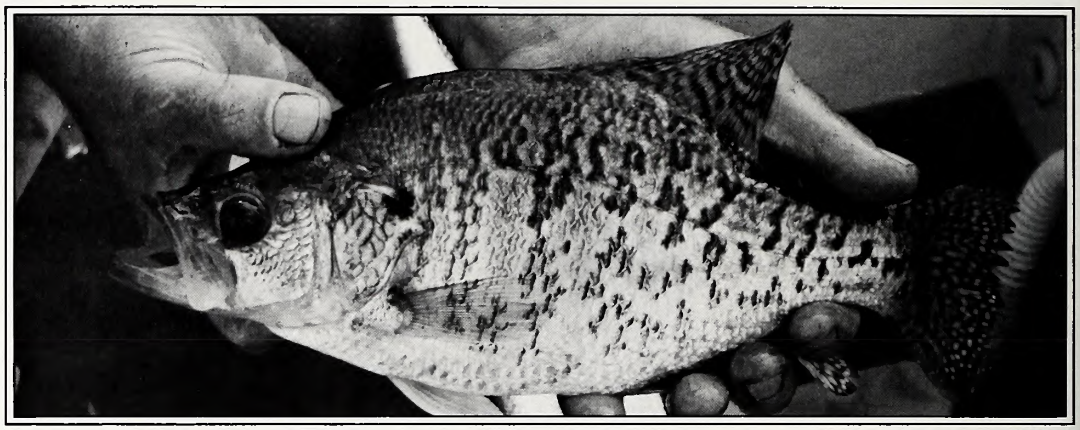
Are you looking for good fishing close to home? If so, try fishing the B. Everett Jordan Reservoir located in Chatham County. The new, man-made, 14,300-acre reservoir offers fine fishing for bass, bluegill and channel catfish — thanks to a stocking program conducted by the Wildlife Commission.

"We began our stocking program for Jordan Reservoir last summer," said Roger Jones, a Wildlife Commission fisheries biologist from Burlington. "We've stocked a total of almost 300,000 largemouth bass in the lake, along with over 500,000 bluegill and red-ear sunfish. Last fall, we also stocked about 15,000 channel catfish in the lake."

The stockings are designed to supplement the expansion of natural fish populations in the reservoir which were found in the Haw River, New Hope Creek, and other feeder streams before the reservoir was impounded. These natural fish populations are expanding to fill the vacant waters. Spring crappie fishing, for example, is excellent from the U.S. 64 causeway and in flooded timber near old creek beds, although no crappie have been stocked in the reservoir.

"Supplemental stockings of game fish are helpful in controlling the expansion of nongame fish populations — which include suckers, shad and bullhead — that were also present in some waters before the reservoir was flooded," said Jones. "In a new reservoir, populations of nongame fish usually expand rapidly. Stockings of predatory game fish — like bass and channel catfish — should help keep nongame fish in check. Stockings of bream will ensure that there will be an adequate food supply for expanding populations of bass and channel catfish — in addition to introducing another popular fishery to the lake. Once healthy, balanced populations of game fish and forage fish are established in the reservoir, a stocking program should no longer be needed."

Fishermen are already reporting excellent catches of bass, bream and crappie in B. Everett Jordan Reservoir. In fact, many anglers are catching and releasing up to 50 small bass in a single trip — with most of the bass averaging 8 to 12 inches. However, rapid growth is expected in the shallow, nutrient-rich waters of Jordan Reservoir, and next year many bass will top the legal 14-inch minimum size limit. The 14-2 regulation applies to largemouth bass caught in the reservoir. This regulation allows anglers to keep up to two bass daily of any size, but any additional bass in the eight-fish daily creel limit must be 14 inches or more in length.



Tom Taylor

Plenty of Sport: *B. Everett Jordan Reservoir near Raleigh is yielding handsome catches of largemouth bass, crappie and bream to anglers, though most of the bass are small. The Wildlife Commission stocked the new reservoir with bass, bream and channel catfish.*

In Outdoor Education

Teacher Workshops Scheduled

Teachers and leaders of youth groups who are interested in outdoor education should plan to attend one of the outdoor-environmental education workshops being offered this summer by the N.C. Wildlife Resources Commission. The workshops are being done in conjunction with the Outdoors North Carolina program of the N.C. Department of Natural Resources and Community Development. Workshop leaders include personnel from the Wildlife Commission, N.C. Forest Service, other natural resource agencies and private conservation organizations.

"Participants will receive three continuing education credits from N.C. State University for attending one of these workshops," said Rick Estes, Wildlife Commission coordinator for the workshops. "These workshops are also supported by the N.C. Department of Public Instruction. Activities will include field investigations in forestry, wildlife, and soil and water conservation. The program will also stress working these topics into the classroom at all grade levels."

The registration fee for each workshop is $10, and the dates and locations are as follows:

— Tuttle State Forest between Morganton and Lenoir from July 11-15

— Holmes State Forest between Hendersonville and Brevard from July 18-22.

For more information — or to register for a workshop — contact the N.C. Wildlife Resources Commission, Rick Estes, Division of Conservation Education, 512 N. Salisbury Street, Raleigh, N.C. 27611 or call 919-733-7123.

Crabs Can't Be Beat

Summer Is For The King Of Crustaceans

One of the most detectable and easily obtained of North Carolina seafoods is the blue crab. These crabs abound all along the Carolina coast, and enough of them for a hefty meal can be coaxed from the salty waters of sound or marsh by even the most inexperienced in a few hours.

Crabbing techniques vary. Some crabbers prefer wading the shallows, crab net in hand, scooping up those unwary of their approach. Others prefer to lure crabs from deep channels with a chicken neck or fish head on a stout string, scooping the clawed crustaceans up when they reach shallow water. Some serious crab connoisseurs invest in a crab pot and let the crabs trap themselves, and those short on time and long on money get theirs from seafood houses. A technique I have found very productive is to combine crabbing with an evening's flounder gigging. Crabs sit tight under a light, and can easily be picked up in a net. If the flounder are scarce, I always come home with something to show for my efforts.

Crabs should be kept alive until they are cooked, and keeping them cool and moist will increase survival time. They can be kept alive for up to two days in a large cooler by placing large chunks of ice in the bottom under a layer of damp burlap. The drain plug should be open so that water does not accumulate and the crabs placed upright on the burlap. Crabs forced onto their backs soon die. After two or three layers of crabs have been caught, they should be covered with another layer of damp burlap. Crabs can also be kept alive overnight by placing them in a basket in a refrigerator. Do not place them in a bucket of water — they quickly use up the oxygen and die.

The universal method for cooking crabs is to drop them, live, into a pot of boiling water. *Any crabs that die before you begin cooking should be discarded.*

My favorite crab recipe, "Crabs in a Chest," hails from the Cajun country of south Louisiana. I think you may like it too.

Begin by preparing a seafood seasoning.

The seasoning: Combine and mix

- 26 ounce box of salt
- 1 1/2 ounces ground black pepper
- 2 ounces ground red pepper
- 1 ounce garlic powder
- 1 ounce chili powder
- 1 ounce monosodium glutamate
- 2 tsp. powdered thyme
- 2 tsp. bay leaf
- 2 tsp. sweet basil

Obtain four dozen crabs and an ice chest large enough to hold them. Plunge live crabs into boiling water and boil for 11 minutes. Remove and place immediately a layer of boiled crabs in the bottom of the ice chest. (If the same ice chest is used that held the live crabs, it should be cleaned thoroughly). Sprinkle boiled crabs generously with seasoning, then place another layer of crabs. Season and repeat process until all crabs are placed and covered with seasoning. Cover with newspaper and close top securely. Heat will steam the crabs and melt the seasoning for flavor. They're ready to eat after one hour, but will remain hot for five or six hours if the top to the chest remains shut.

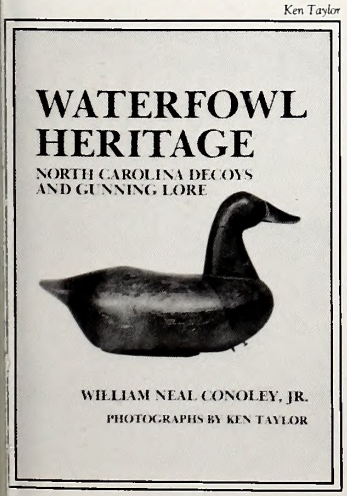
Cover a table with newspapers, and serve with your favorite beverage to eight of your closest friends. This recipe is also good with shrimp, and a crab-shrimp combo is a seafood delight. And if you add some boiled potatoes and freshly cooked corn on the cob to your cooler of steaming shrimp and crabs, you'll have a Dixified version of a New England clambake.

— *Curtis Wooten*

Book Review

Our Waterfowl Heritage

Ken Taylor



Waterfowl Heritage, North Carolina Decoys and Gunning Lore, by William Neal Conoley, Jr., Ed.D., 324 pp, published by Webfoot, Inc., P.O. Box 248, Wendell, N.C. 27591. Regular edition $35, limited edition of 200 copies with leather binding, leather-encased box, gold trim and silk-ribbon marker is $200 plus $2 shipping.

At last, there is a definitive book on North Carolina's rich heritage of waterfowl hunting and decoys. Through the use of over 430 photographs — including over 65 in full color — Dr. Conoley leads the reader through both the geography and sociology of the State's main waterfowl regions as well as the nostalgic days of the market hunter, the big waterfowl clubs, and the folk artistry of early and contemporary decoy carvers. Many of the photographs were taken by Ken Taylor, chief photographer for *Wildlife In North Carolina.*

Utilizing his background as a professional in both the fields of education and natural resource conservation, his love of waterfowl hunting, decoy collecting, and his recognized accomplishments as a wildlife sculptor and decoy authority, Dr. Conoley has been able to combine both expertise and talents to cover the subject matter with unique degrees of understanding and feeling.

Whether enjoyed and used for its historical content or as a reference for identifying and cataloging North Carolina's waterfowl decoys, *Waterfowl Heritage* should be considered a must for the serious waterfowl enthusiast. This book itself is destined to become a part of North Carolina's waterfowl heritage, and — as is the case with other fine, collectible books — it has a good chance of appreciating in value.

Only $5

1983-84 North Carolina Wildlife Calendar

Six nationally known wildlife artists have contributed fine outdoor and wildlife paintings to the 1983-84 calendar. Their paintings are in museums and private collections throughout the country, and you've seen examples of some of their work in WILDLIFE IN NORTH CAROLINA magazine. This calendar is almost certain to become a valuable collector's item with such artists featured as:

- Bob Binks
- Bob Dance
- Cecil Eakins
- Larry Barton
- Duane Raver
- Lee LeBlanc

Calendars are $5 each; however, if you purchase 50 or more, we will sell them to you for only $4 each.

This is a project of the Chairman's Wildlife Advisory Committee, a group of North Carolina conservation leaders who have been appointed by the Chairman of the Wildlife Resources Commission to provide information, guidance and support for the agency's wildlife conservation programs. Proceeds from the calendar will go for these purposes.

Yes, please send me _____ copies of the North Carolina Wildlife Calendar. I have enclosed cash, check or money order for _____. We do not bill.

Name _____

Street _____

City _____ State _____ Zip _____

Phone Number (including area code) _____

Return form and payment to Chairman's Wildlife Advisory Committee, care of George Mason, P.O. Box 473, Dallas, N.C. 28034 or give the form to a member of the committee. Checks should be made out to the Chairman's Wildlife Advisory Committee.

Calendar of Events

July 1-4
13th annual Fly-In and Thresher's Reunion at the Denton Airport.

July 4
8th annual Lumber River Regatta at Riverton Park in Wagram. Canoe and raft races and entertainment.

July 4
Torchlight Procession at Old Salem in Winston-Salem. A re-enactment of the procession that took place on July 4, 1783.

July 4-8
Captain Fannie's Billfish Tournament at Atlantic Beach. Trophies for blue marlin, white marlin and sailfish. For more information, contact the Anchorage Marina, P.O. Box 7, Atlantic Beach, N.C. 28512.

July 7-9
Southern States Morgan Horse Show at the State Fairgrounds in Raleigh. For more information, contact the State Fairgrounds, 1025 Blue Ridge Boulevard, Raleigh, N.C. 27607.

July 9-10
28th annual Grandfather Mountain Highland Games and Gathering of Scottish Clans at Linville. Traditional Scottish sports, bagpipe music, and other activities. For more information, contact Grandfather Mountain, Harris Prevost, Linville, N.C. 28646.

July 16-17
Carolina Sailing Club Race on Kerr Lake at Townsville. For more information, contact Kent Mullikin, 101 Windsor Place, Chapel Hill, N.C. 27514.

July 20-23
Summer edition of the 36th annual Guild Fair of the Southern Highland Handicraft Guild at the Asheville Civic Center.

July 23-24
Oak Hollow Boat Drags at Oak Hollow Lake in High Point. Largest championship boat drag race in the East. For more information, contact the High Point Jaycees, 508 N. Hamilton St., High Point, N.C. 27262.

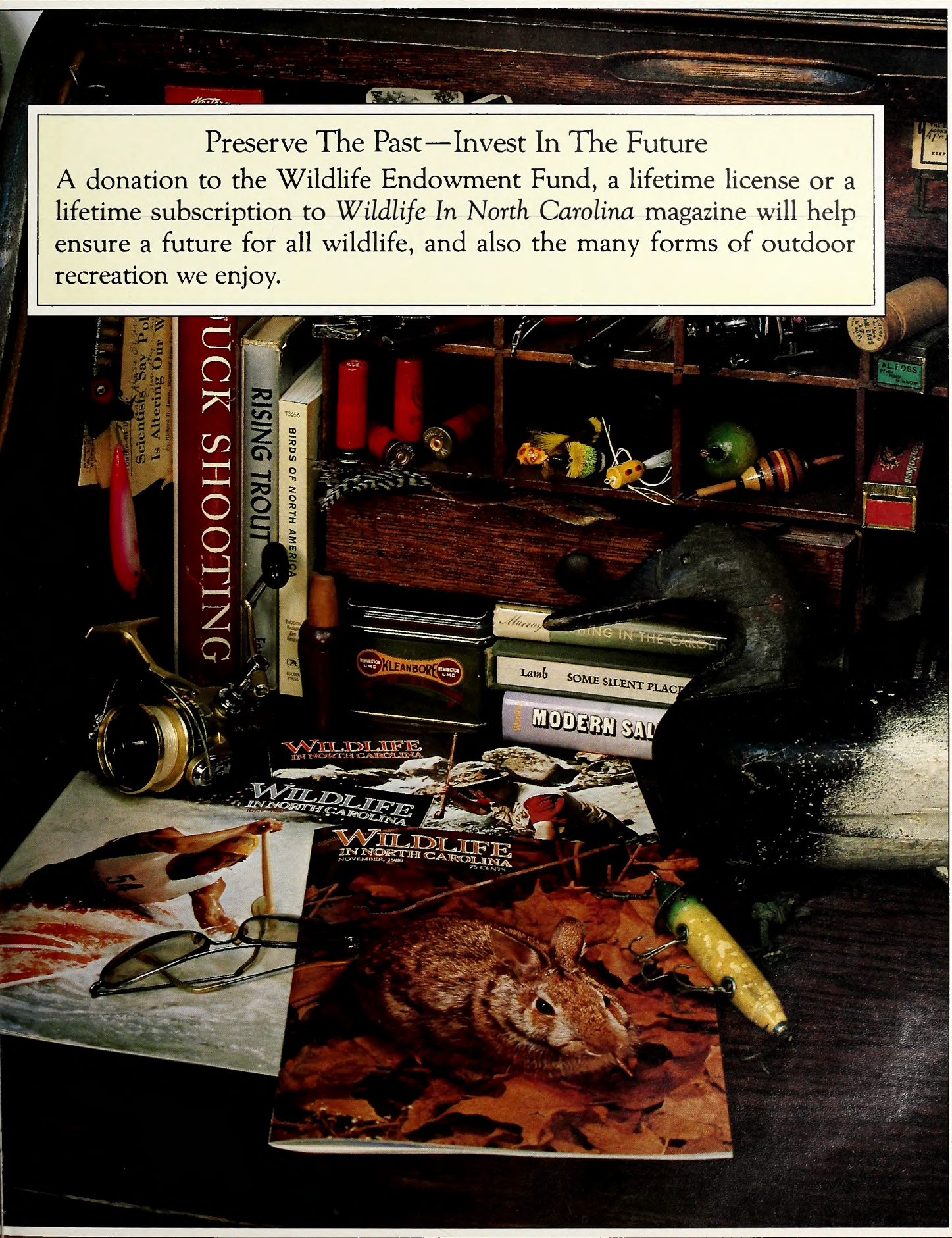
July 27-30
18th annual Gemboree at the Macon County Fairgrounds in Franklin. Gem and mineral show and sale.

July 29-31
John Rowe Trapshoot at Pinehurst. For more information, contact the Pinehurst Gun Club, P.O. Box 4000, Pinehurst, N.C. 28374.

The Wildlife Endowment Fund Report

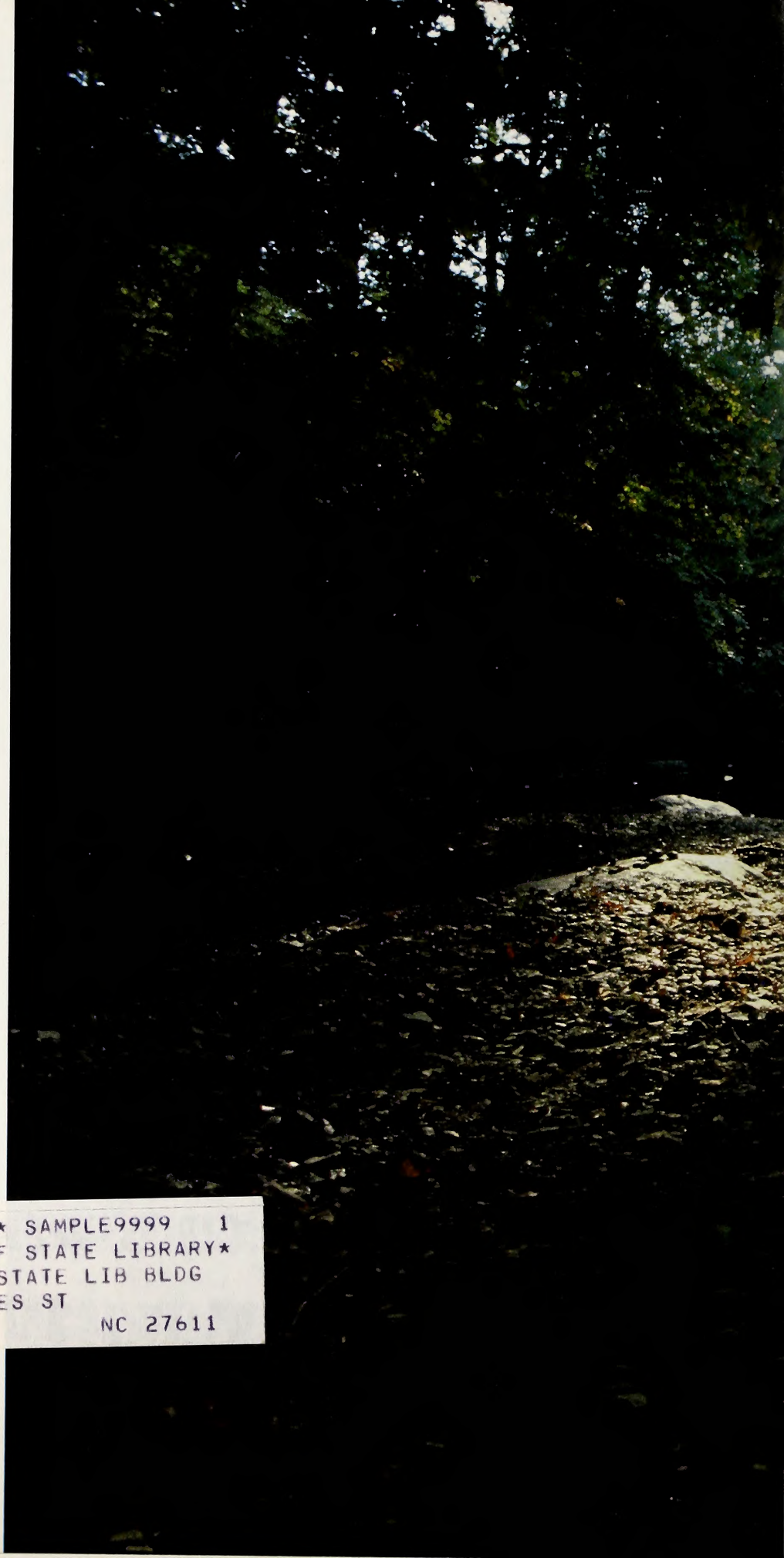
Status on April 30, 1983

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	4,112	$1,182,447.77
Lifetime Hunting License	49	8,072.63
Lifetime Fishing License	151	24,095.82
Lifetime Subscriptions to Wildlife In N.C.	154	16,149.95
Contributions	—	15,520.00
		Fund Total: $1,246,286.17



Preserve The Past—Invest In The Future

A donation to the Wildlife Endowment Fund, a lifetime license or a lifetime subscription to *Wildlife In North Carolina* magazine will help ensure a future for all wildlife, and also the many forms of outdoor recreation we enjoy.



Childhood Creeks

Fortunate are those whose youthful memories are laced up in the winding flow of a creek.

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WILDLIFE IN NORTH CAROLINA

AUGUST, 1983 75 CENTS

A Matter Of Ethics

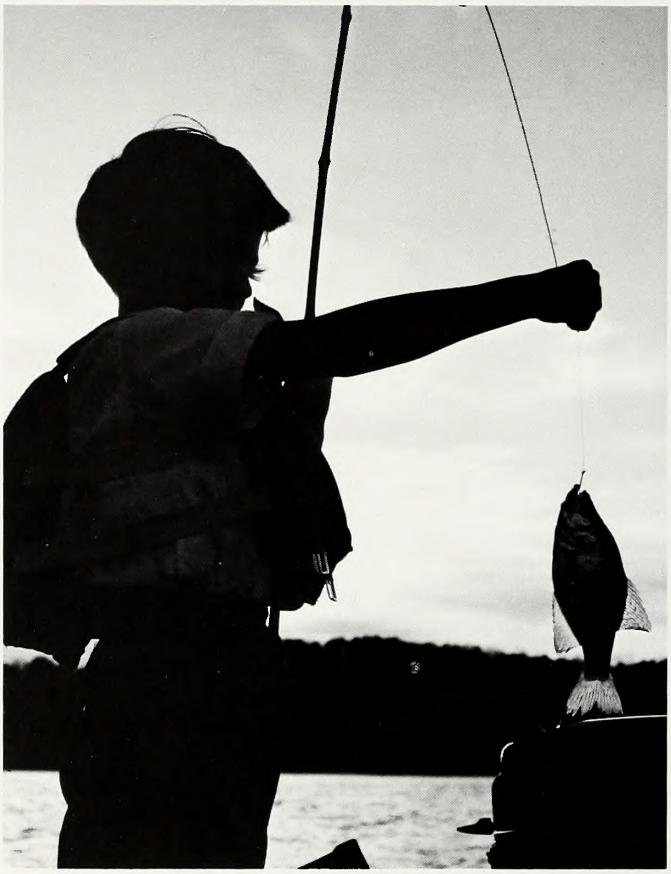
by Jim Dean

One of the issues being tossed around in wildlife agencies and outdoor groups today is the matter of ethics. Outdoor ethics. No one is quite sure how to define outdoor ethics, or how to teach them, but most everyone agrees that we need more of them.

Webster defines ethics as "a system of moral principles." My grandfather would have called it "doing right," and he spent the better part of 84 years doing just that. His son, my dad, carries on the tradition, and nowhere is it more carefully applied than in matters dealing with the outdoors. Neither ever knowingly violated a hunting or fishing regulation, and they always went to a good bit of extra trouble to know what those regulations were.

The trouble is that I can't tell you why. Why does one person leave a dove field with 10 doves — two short of the limit — because he knows he shot those two other doves even if he couldn't find them? Why does another person consider it a challenge to shoot as many doves as possible, and leave all of them lying in the field to rot? Why does one person chuck a bag of empty burger boxes and paper cups out on the highway, while another will stop and pick them up?

More to the point, how do you teach good outdoor ethics — or ethics of any kind? Experts in human behavior tell us that such considerations or habits are formed very early, perhaps before we are five years old. That seems to be true, and if it is, what can we do about all the adults who are long in the tooth and short on ethics?



Kids can easily be taught ethical outdoor behavior, but an adult who was raised as a slob is likely to remain one.

That's one of the questions being pondered by the Southeastern Association of Fish and Wildlife Agencies under an ambitious cooperative outdoor ethics program, and the North Carolina Wildlife Resources Commission is taking part in this program. Numerous groups like the Izaak Walton League, the National Shooting Sports Foundation, the Ding Darling Foundation, 4-H clubs and others are looking for ways to improve our awareness of and stewardship of all natural resources.

It is not going to be easy. No column or editorial is likely to have a major impact on someone who is basically unethical. Nor is it a simple matter of increased law enforcement. Sure, a game violator is likely to be more careful if he knows a wildlife officer is watching him, but some 200 officers are spread pretty thin in a state that encompasses 33 million acres, and the same is true throughout the nation. Many hunters and fishermen already obey laws and regulations, but others do not, and they are spoiling it for the rest of us.

More important, outdoor ethics involve everyone — not just those who hunt and fish — and that message must be spread. All of us — even those who consider themselves nonconsumers — have an effect on the environment because food, clothing and shelter are all drawn from the natural world around us. Even seemingly minor decisions involve outdoor ethics. For example, how do you explain to a housewife that her choice of garden sprays involves ethics? Has she used a chemical too deadly when a safer one would work? Has she used too much of it? Will it kill songbirds and wildlife or perhaps a neighbor's pet? Such examples are legion, and largely overlooked.

The biggest problem is getting every citizen to recognize that outdoor ethics is a matter of daily concern to them in countless ways. National conferences have already reached the conclusion that one of the best ways to reach this goal is to teach proper outdoor ethics to young people while they are still in their formative years. School programs are planned, and are already under way in some states. Wildlife agencies are also forming youth programs, and these show promise. But any efforts involving young people — while perhaps ultimately the most effective — are long term at best.

That brings us back to adults. What do we do about them? Peer pressure may be the best bet. A man or woman who litters or habitually keeps more fish or game than the law allows will do so only when alone or in the company of others who do the same or tolerate it. Those of us who practice sound outdoor ethics must set a good example for our friends.

Go fishing with my friend, Mike Gaddis, and see what happens if you try to keep an undersized fish or exceed the limit. You'll hear about it — guaranteed. Not only that, if you persist, you will lose a friend. Mike would probably tell you he's lost a few "friends" because of that, but I'll bet he's also converted a few to his way of thinking.

Sooner or later, all these efforts will begin to have an impact, and that impact is likely to snowball. Ethics is essentially the joy of unforced honor — the pleasure of "doing right," even if you don't stand a chance of getting caught "doing wrong." It is naive to expect to teach everyone to act ethically, but we must at least try. We owe it to ourselves, and to the natural world we love. Surely some progress can be made.

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August, 1983
Volume 47, Number 8

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

AUG 5 1983

CONTENTS

4 **Jewels Of The Gulf Stream** *by Joel Arrington*
Flashing neon green and yellow, dolphin are perhaps the most handsome of all gamefish.

9 **Build Your Own World** *by Jane Rohling*
Even taped tightly shut for years, this water world in a jar will sustain tiny forms of life.

12 **Survival In The Pond** *by Lawrence S. Earley*
It's eat or be eaten in the average pond, but even the most vicious predators don't always survive.

20 **Hunting For Bass** *by Mike Gaddis*
Finding bass is the key to catching them in hot weather, and the plastic worm is still the best all-round lure.

26 **Aerial Lumberjacks** *by Curtis Wooten*
Paul Bunyan would never recognize this modern timbering technique.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

Back Of The Book *by Mark Taylor*

Cover *A bass has cornered a tasty crayfish, but the prey may still escape with a sudden thrust of its tail which can push it backwards with incredible quickness. Photo by William Roston.*

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Tasty Legs

written by Lawrence S. Earley / illustrated by David Williams

One of the tastiest creatures in our marine waters has 10 legs, grows more if it needs them, sheds its skeleton about 20 times during its lifetime, and is considered beautiful — in fact its name in Greek means "beautiful swimmer."

It's the blue crab (*Callinectes sapidus* — *Callinectes* means "beautiful swimmer;" *sapidus* means "savory"), whose fame as an edible keeps a $7.5 million industry booming in North Carolina. Like shrimp, lobsters and crayfish, the blue crab is a crustacean, but unlike them it is a 10-legged crustacean, or a decapod. Of its 10 legs, the middle six are used for walking, the rear two, paddle-shaped, are swimming legs, and the front two are used to defend itself or to grasp small fish, clams, oysters or mussels for eating.

With such a wealth of legs, it can afford to lose one now and then. When it gets in a bit of a jam with another blue crab, it can drop a leg which will usually satisfy the other crab, enabling the now nine-legged crab to make its get-away. The leg will grow back later. The legs of males are blue down to their tips; the tips of the females' legs are a feminine pink.

In the course of its two- to three-year lifetime, the blue crab will grow from the microscopic larval form (called the zoeal blue crabs) to a mature 5 inches. For a creature who wears a hard and inflexible shell, something has to give. Fortunately, something does. The blue crab molts — it sheds its bony exoskeleton, or external covering — about 20 times during its life. As a larva, the blue crab will molt every 3 to 5 days; as an adult it will molt once every 25 to 50 days. In its softshell condition, the crab is in a perilous state, vulnerable not only to channel bass and drum but also to that tireless predator from above, man. Eaten any way the blue crab is a treat, but the softshell crab is a delicacy ranking high in the pantheon of man's culinary pleasures. Crabbers know when crabs are about to molt and will keep them in water until they do.

William W. Warner's book *Beautiful Swimmer* (Penguin Paperbacks, $3.95) is a good place to learn about blue crabs. The crab begins life as one of several million microscopic larvae produced by a single female in the salty water near inlets. Though it will spend the bulk of its life in the estuaries and salt marshes fringing the coast, for the first 50 days of its life it will be swept by the currents out to sea. There, if it survives (only one out of a million eggs will!) it will molt seven or eight times and then return to the estuaries to grow, culminating its larval development by passing through the megalops and the first crab stages.

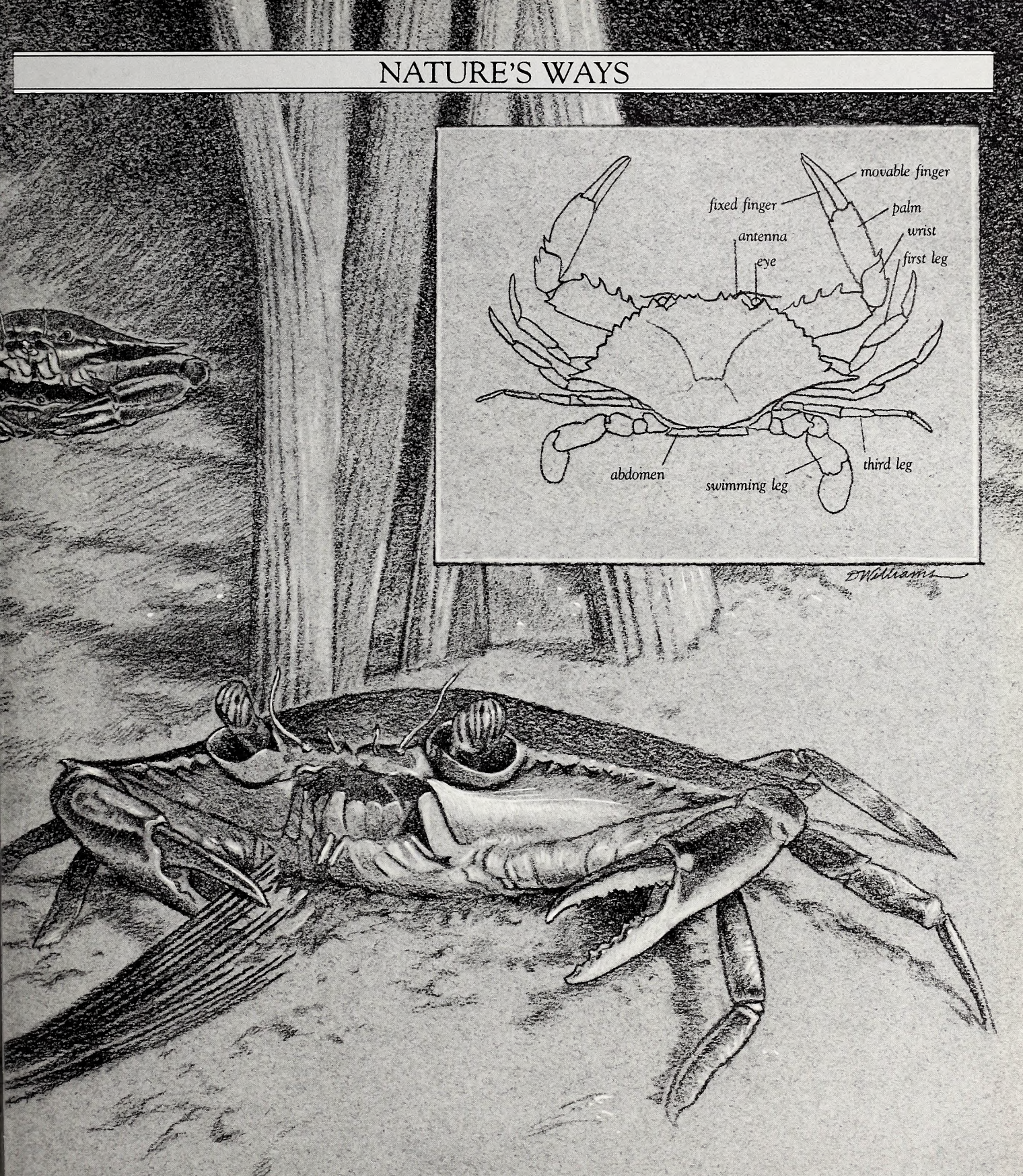
When the first cold weather begins to slow them, the blue crabs, young and old alike, burrow into the soft estuary mud bottoms for the winter, all but their turret-like eyes and the tips of their fighting claws hidden. The following spring they will continue growing, molting again and again until they reach maturity either that summer or the next. During the late summer and early fall, most blue crabs will mate, although mating activities can occur earlier or later. The female emits a chemical attractant as part of the courtship process, and she will also wave her claws to attract mates.

When the female accepts the male's courtship, she allows herself to be carried underneath the male for two days. These traveling pairs of crabs are called "doublers" by crabbers. At this point the female undergoes her last molt, and then the actual mating takes place, face to face, lasting from 6 to 12 hours. The male carries the vulnerable female for another two days until her shell hardens, and then they separate, the female traveling down to the inlets again where she will spawn and then die, the male to the salt marshes where he will eventually meet his end.

Left behind are millions of larvae, most of which will be eaten by the teeming creatures of the sea. But a few will survive and the life cycle of the beautiful and savory blue crab will begin again.

Mating takes place in August or September for most blue crabs. Before they mate the male cradles the female with his legs. Called "doublers," the pair travels together for two days. Then the female molts for the last time, and mating takes place.

Blue crabs go through several stages in their development. (A) Called zoeal crabs, the microscopic larvae grow larger by shedding their shell — a process called molting — every three to five days, seven or eight times in succession. (B) They are then at the megalops stage which is still very small. (C) At the first crab stage, the tiny crab finally takes on a recognizable blue crab shape, although it is only a speck in the water. The blue crab will molt another 20 times before it is fully grown.



The blue crab (Callinectes sapidus) *is a favorite inhabitant of North Carolina's sounds. It moves up the sounds to grow and to mate, and then the female swims back to spawn in the saline water of the inlets. Blue crabs will eat small fish, oysters and clams, but they are scavengers, too, eating dead animals.*

Jewels Of The Gulf Stream

Dolphin are not only among the most handsome of all game fish, they are tops on light tackle. Here's how to catch them.

written and photographed by Joel Arrington

When first caught, a dolphin seems to glow in brilliant yellow, green and blue, yet the colors quickly fade unless the fish is released.

Ask most people to describe a dolphin, and odds are excellent that you will get a perfect description of a porpoise. Indeed, the fish called dolphin is so often confused with the marine mammal of the same name that some publications have adopted "dolphin-fish" as the proper tag.

But it's not porpoises we're concerned about here. It's the true fish — the dolphin. It's a fish that is unquestionably one of the most handsome of all marine fishes, and one of the finest gamefish sought by offshore anglers. That it is also delicious eating and found worldwide in both tropical and subtropical seas is hardly to its discredit. Off the Atlantic Coast, it is found in association with the Gulf Stream, and has been caught as far north as Prince Edward Island.

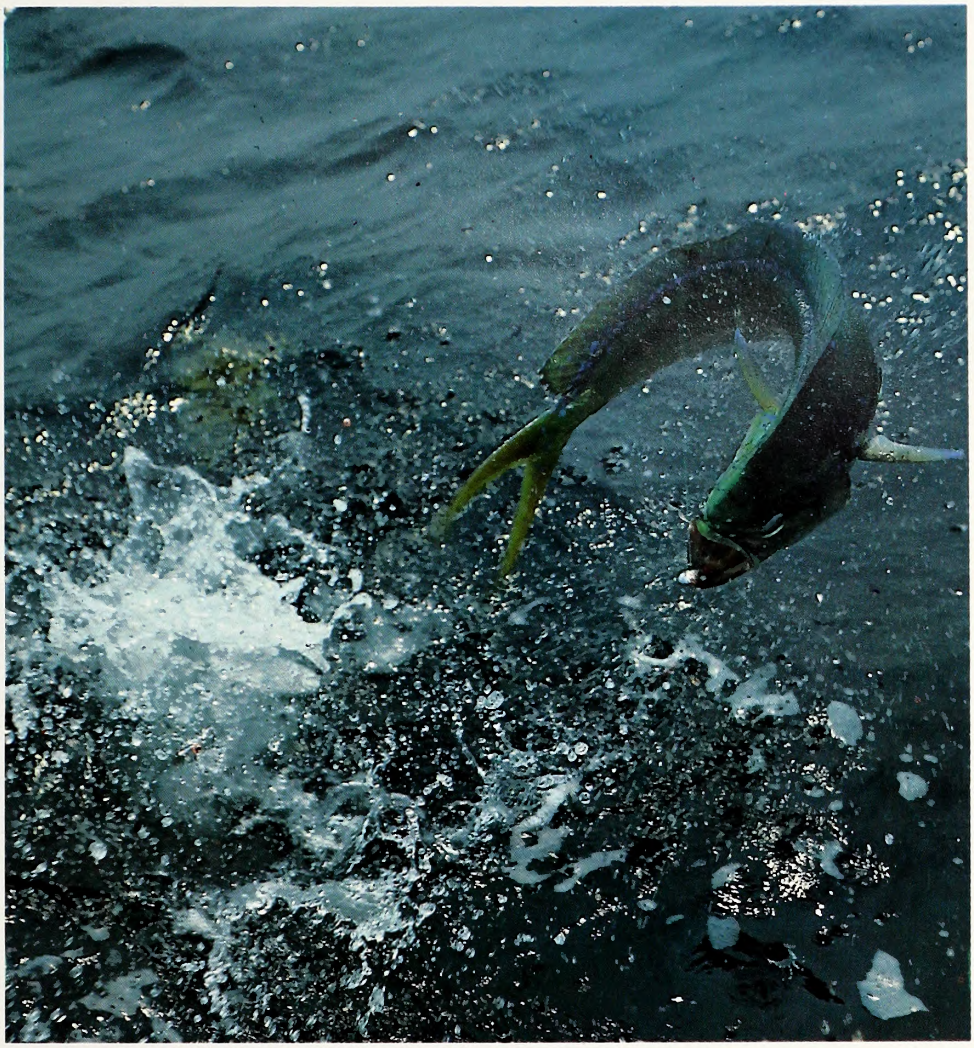
The first dolphin arrive off North Carolina every year in May. They have followed the Gulf Stream north, hanging close to sargassum weed and floating debris. Dolphin are present offshore in varying numbers through the summer, but charter skippers, fishing daily, sometimes go for weeks without seeing any. In the early fall, you find these pelagic fish heading south against the Stream and by October all but a few stragglers have passed Cape Hatteras as they migrate to Florida, the Caribbean and Gulf of Mexico. In most years, population peaks seem to occur along the mid-Atlantic in June and Setpember.

There is considerable variation from year

TIDA
FISHING TEAM
International

to year in how many dolphin we have off North Carolina. One summer there were more than 30,000 caught out of Oregon Inlet alone. Most years we see far less, but, still, waters off the Outer Banks are among the most productive. Like many other fish, dolphin reproduce with varying success, depending on factors we know little, if anything, about. They are not particularly vulnerable to commercial fishing, fortunately, and sport fishing has little appreciable effect on population levels, except very locally and temporarily. So there are other, apparently unknown, factors which determine how many fish we have every season.

When southeasterly winds persist for several days off the Outer Banks, warm Gulf Stream water (and anything floating on it) is blown inshore, sometimes right up to the beach. Last summer, John Ochs launched a small boat in the surf near his home at Buxton on Hatteras Island to fish for Spanish mackerel. Instead, just beyond the breakers, he found floating weed mats and school dolphin which he caught on a light spin rod. Occasionally, someone will catch



Dolphin are normally offshore fish and are most frequently caught around floating mats of Sargassum weed in the Gulf Stream (left). Small school dolphin up to about 5 pounds are top sport on a flyrod or light spinning tackle, leaping countless times. Big dolphin tend to be loners or run in pairs.

To Cook A Dolphin

Experts recommend that you cut the tails off dolphin to bleed them. They say it improves the flavor. Although I have never done this, I still count dolphin as one of my top two or three favorite fish to eat. The small ones are a little better than the big ones, but not much. You really should ice them right away for top flavor, although dolphin do not spoil particularly fast.

The skin is tough, so it should be removed. You cut around each side and, with pliers, grab the skin at the top of the head and rip it off toward the tail. It comes easier this way than from the tail toward the head. Then cut the filet from the backbone, trim off the dark meat and bag the filet. Dolphin freezes well and maintains good flavor at least three months or a bit longer.

The meat is good fried, broiled, barbecued, and smoked — cooked any way, really, or cut into cubes and covered with lime juice for seviche. The roe is at least as good as shad roe, but somewhat different in flavor.

Here is a recipe, with slight modification, from A.J. McClane's *Encyclopedia of Fish Cookery* (Holt, Rinehart and Winston, 511 pp. $35):

2 pounds boneless filets, trimmed into portion-size squares about 1" thick
1/2 cup lime or lemon juice
salt and pepper
1 pound dolphin roe
flour
2 tablespoons oil
6 slices bacon
1/2 pound butter
3 garlic cloves, finely chopped
1 teaspoon dried tarragon or 1 tablespoon fresh tarragon, minced
2 tablespoons minced parsley
lime wedges

Marinate dolphin squares in juice for 30 minutes, turning several times. Place on greased foil in a pan. Sprinkle with salt and pepper and set aside to cook later. If the roe is a pound or more, place in cold water with a little lime juice and simmer until just firm. If small, just wash and pat dry. Dust roe with flour. Cut the bacon cross-wise into narrow strips, add to oil in a skillet and cook until translucent. Add the roe and saute until the outside is brown, then break up with a fork into small pieces. Add 4 tablespoons of the butter, the garlic and tarragon. When the butter has melted, remove roe from heat.

Bake the dolphin in a preheated 275° F. oven for about 15 minutes or until it flakes, basting with the remaining butter. Do not brown. Pour juices from the oven pan into the roe and quickly reheat. Arrange dolphin pieces on individual serving plates, spoon the roe mixture over them and garnish with lime wedges and parsley.

a dolphin from a pier. One summer we found a weedline just a mile off the Hatteras Inlet sea buoy. We hoped to catch a few small bluefish for live baits that morning before running offshore, but instead caught dolphin weighing from 2 to 4 pounds. We did it with fly rods and popping bugs of the type you use on farm ponds.

But usually you have to go to the Stream for dolphin off North Carolina. They are warm-water fish with extraordinary growth rates. The school-size fish we catch that weigh 2 or 3 pounds are just a few weeks old. The very largest are said to be only three or four years old. The world all-tackle record, according to the International Game Fish Association, weighed 87 pounds and was caught off the Pacific side of Costa Rica. The largest ever recorded from the Atlantic Ocean was caught off Nags Head, North Carolina, in 1973 and weighed 77 pounds. Fish weighing in the 30s and 40s are quite common off North Carolina.

Dolphin associate in schools until they weigh about 10 to 15 pounds. Beyond that, they are more likely to be found in pairs, usually a male and a female. But even these big fish hang around floating weeds and flotsam. The older males develop a high, almost vertical, forehead, and are referred to as "bulls." The females are correspondingly called "cows."

Dolphin are nearly ideal gamefish. They readily take bait and lures, leap wildly during a strong fight and are among the most prized fish on the table. No fish jumps more than a dolphin when hooked. Their brilliant colors include iridescent blues, greens and purple, vivid yellow and gold. The Spanish name for them is "dorado," which means gilded. All these hues are infinitely mutable. Waves of color wash over the live or dying fish. Like billfish, dolphin will "light up" just before taking a bait. When excited, their pectoral and caudal fins glow as if electrified.

Everybody likes dolphin except billfish anglers. Carefully sewn baits can be destroyed instantly by a marauding school of "green hornets." Most skippers gun their engines to try to outrun the dolphin, which, on a bright day, can be seen coming some distance away. Often dolphin leap from the water, greyhounding after the escaping baits. More often than not, they catch them, and mates have to re-rig.

Even small dolphin will attempt to eat good-sized baits. Anglers after billfish, tuna and wahoo often skip rigged mullet, balao, and squid. Large dolphin will take them as well as almost any live fish they can catch. Smaller dolphin eat mostly flying fish and other species that are found in offshore weed mats — triggerfish, filefish and jacks. One summer the dolphin we caught off Oregon Inlet had gorged on sea horses. When digested, these little creatures left a fine, gritty mud in the dolphin's digestive tracts. Because stomachs were accidentally cut during cleaning, this grit was spread to the meat and could not be washed away. This did not become apparent until much later, so quite a few pounds of filets were ruined.

Nearly all dolphin are caught by trolling. They will hit feathers, jigs, strips and all but the biggest "fast lures" that have come into vogue recently for billfish. Unfortunately, many are caught on tackle meant for bigger fish. However, if you hook one that weighs 30 or 40 pounds, you will be glad if it is on 50-pound tackle, because, pound for pound, there are few, if any, stronger fish.

Nevertheless, you will have more fun with dolphin if you match the tackle to the fish — to the extent possible. When you approach a weed line and find schools of small dolphin, you may change to 30-pound or smaller tackle if you have brought it. Most charter boats are set up to help you "bail" dolphin if you want to. This involves holding at boatside a "Judas fish" that you have caught on a heavy rod to attract the usually curious school, and further attracting them with chum — bits of fish the mate has cut up and thrown overboard. Then you may catch many on any light tackle you may have aboard.

Probably spinning tackle is most popular. Twelve-pound test will be about right, and you should use a short piece of mono testing about 40 pounds as a leader. Many of these fish are too small to gaff, so it is well to bring a long-handled net. Charter boats, almost without exception, do not have them. The alternative is to tie in a 5-foot piece of heavy mono as a leader and fish lures with stout hooks so that you can grab the leader and swing the fish aboard. Remembering the net lets you fish a short leader and smaller lures with light-wire hooks. White or yellow butterbean bucktails weighing about 1/2 ounce are excellent, although dolphin will hit just about any small artificial. Lures with treble hooks are harder to remove quickly than single-hook lures.

You may fish fly tackle for these school dolphin, too. A fly rod matched to a weight-forward No. 8 line will do nicely if you fit it with a reel that has not only a click drag, but a flange that permits you to add drag with your fingers. The line should have 50 to 100 yards of backing behind it.

Usually school dolphin will take any lure, including streamers, without hesitation. There are exceptions. Fairly often, they will not take streamers well, but they will take poppers. Rarely they will follow curiously, but will take nothing. On a cloudy day off Cape Hatteras, we once were holding a school of 5-pounders behind the boat and casting streamers tied with flashy mylar. The fish would charge a lure and then suddenly stop when you moved the fly as if they had hit a pane of glass. Finally, we learned to let the flies sink dead in the water, like the chum we threw overboard, and we caught several fish. But that was unusual behavior for dolphin.

The real treat for experienced anglers is to have within casting distance dolphin that exceed the usual school size of under 6 pounds — a rare occurrence in our waters. Once, a 17-pounder was the only big fish accompanying a school of small dolphin we were working off Hatteras. We tried for several minutes to get a jig in front of it, but always a small fish would rush in and take the lure; then the big one would disappear for a few minutes. Finally Bob Smirnow made a cast right on target when he saw it reappear, hooked and finally caught the fish on 12-pound test spin.

At times, large fish school together. They might be 20-pounders or bigger, and it doesn't happen often. It's very difficult to hook the single fish you sometimes see around a floating plank, but if there are several, and the element of competition comes in, they tend to lose caution as you ease your boat up within casting distance. You can hold way off and cast a popping plug with a surf rod, and you have a good chance of a hookup. But when you have to bring a boat within 60 or 80 feet for a fly cast, it's much more difficult.

For bigger fish like this, you need a beefy rod — No. 11 or 12 — and a big first-class reel, like the Capt. Mack or Fin-Nor. You also need patient and understanding fishing partners, because if you hook one of these fish, you will be some time playing it. I once hooked a 12-pound dolphin on a heavy jig while working kings on a wreck. It was quite accidental, but I had 15-pound test line on a good revolving spool reel and a stout rod, so I expected a tough fight, but a short one. That fish just would not give up. I have caught bigger amberjack and cobia that were not as strong as this fish, which was apparently just an exceptional athlete. I have also caught plenty of other larger dolphin that weren't near the fish this one was. It must have taken 15 or 20 minutes to boat that dolphin.

It was a memorable fish, yet that may be true of all dolphin. Certainly, you will not forget the shimmering color of the first one you catch, or the power or flavor. Nor will you ever again confuse them with porpoises.

Build Your Own World

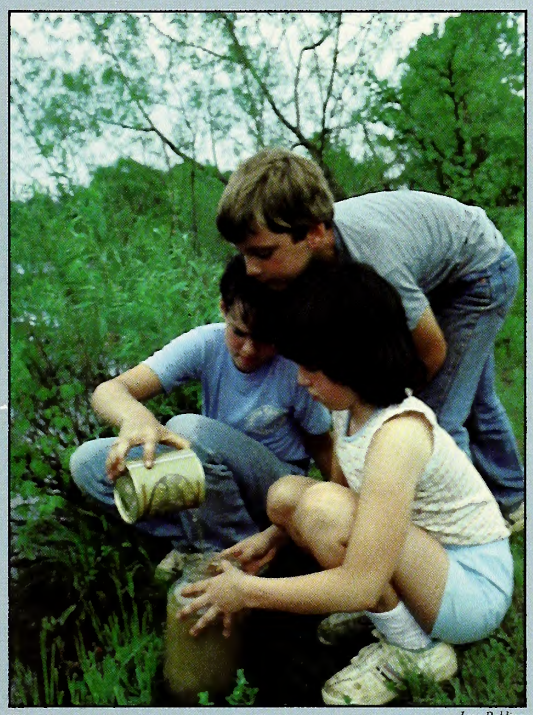
by Jane Rohling

With a jar, some tape and a pond, you can build a small aquatic world that will sustain itself for years.

If you've been looking for the perfect pet, this may be the answer. In fact, you can bring home several thousand little critters for your family to enjoy without having to worry about feeding them, walking them, taking them to the vet, or cleaning up after them. This could well be the maintenance-free solution to every parent's pet problem!

It's a tiny world in a jar, a microcosm, and it's just as easy to put together as it is to maintain. Teeming with plant and animal life, your tiny world can sustain itself for many years and will fascinate the entire family.

Try to find a healthy pond, one that has some vegetation along the edges, but not one that's choked with mats of algae. It would be best not to use a pond in a pasture where there are cattle grazing — they often wade in the water, stirring up the mud and leaving manure behind, both of which are harmful to aquatic life. Ponds in fields where crops are growing might not be suitable either. Such ponds tend to have a lot of nutrients in them from fertilizer run-off, and this could lead to an algae bloom in your microcosm, something you don't want.



Jane Rohling

Creating your own world is easy and fun. With a bottle and a nearby pond, children and adults can discover life that ordinarily escapes the eye.

You'll need a one-gallon wide-mouthed jar, the kind used in restaurants for pickles or ketchup — and a restaurant is a good place to get one free. The jar should be cleaned thoroughly with soap and then rinsed several times with water to be sure there is no detergent left in the jar. Even a trace of detergent could kill small, sensitive water animals. You'll need the top of the jar, so be sure to save it.

Use an old coffee can to scoop mud and water out of the pond into your jar. A plankton net made out of a fine-meshed cloth with a jar at the end can be dragged through the water to get a good sample of tiny plants and animals from the pond. However, this is not necessary because you should get plenty of them in the mud, water and plant debris you put in the jar.

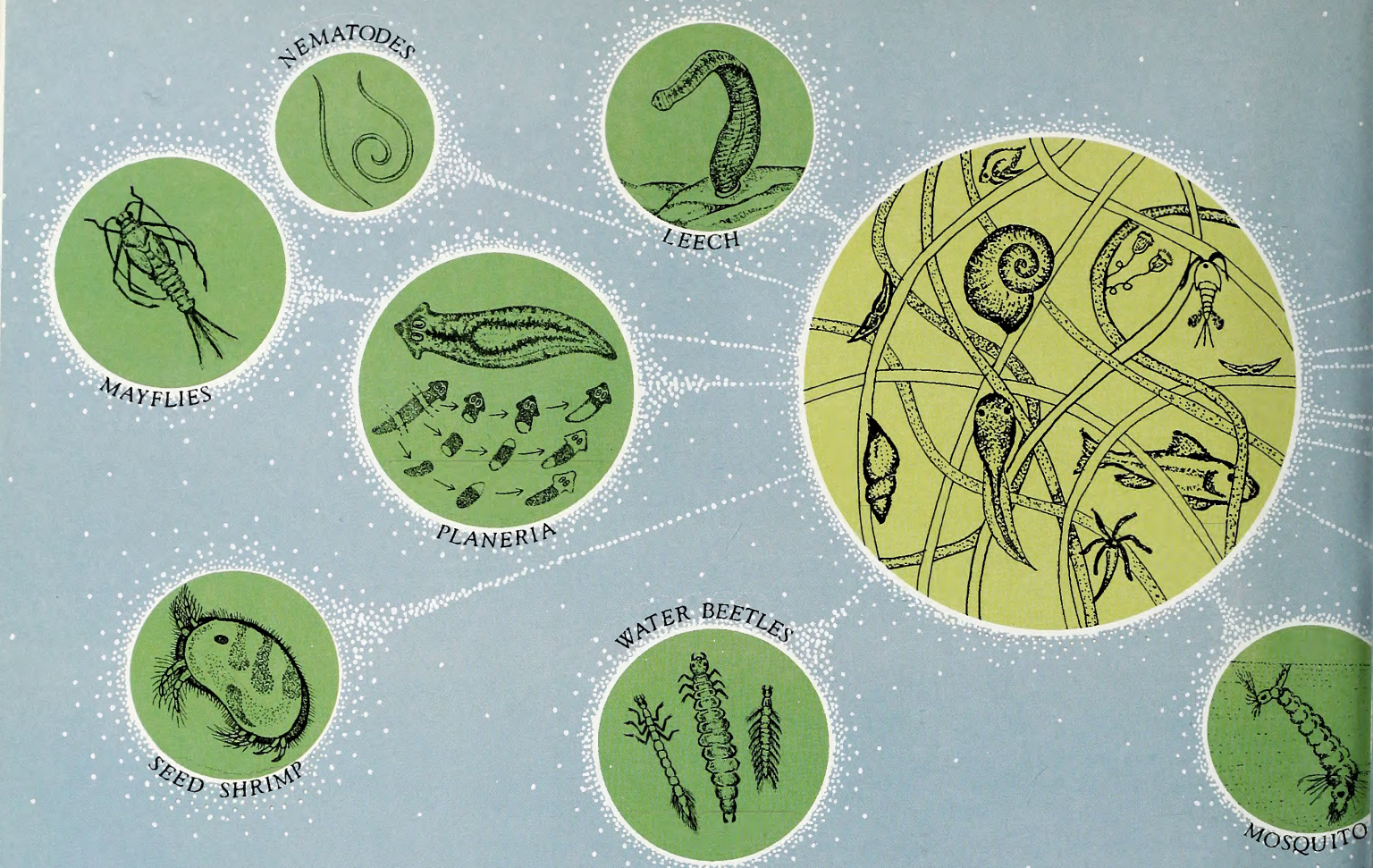
Find a spot along the edge of the pond with some living and dead plant materials. First, scoop out enough mud from the bottom of the pond to fill the bottom of the jar about an inch or two deep. Don't add too much mud — roughly 80 percent of the jar should contain water.

Next, reach in and pull out some of the leaves or other dead plant materials along the shore and a few living plants as well. A little duck weed or a small emergent plant (one that is rooted in the mud but has leaves or flowers at the surface) is fine, but you don't want them to dominate the jar, or block sunlight to the water beneath them.

Now fill the jar with pond water, leaving a couple of inches of air space at the top. Be sure that you haven't caught any large animals like tadpoles or dragonfly larvae in the jar. Larger animals require a lot of food, and many larval animals that are found in ponds must leave the water when they mature. A couple of small snails are probably okay, but you have to be careful they don't overpopulate. If you want to study these larger animals, set up another jar for them with a screen on top. They're fascinating too! At first you may not think you have anything else living in the jar, but after the mud has a chance to settle for a few hours you'll begin to see signs of movement. The more the water clears, the more you'll see, so once you get the jar home, put it where it won't be disturbed, and wait patiently. After the water has cleared, remove any large animals you missed earlier and return them to the pond.

Now you're ready to seal the jar lid with plastic tape. From this point on, your jar is an entirely self-contained, self-sustaining ecosystem — a microcosm that will perpetuate itself for many years without any interference or help from you.

You're probably wondering how this little world in a jar will manage to keep living after the jar has been sealed. It's really pretty simple. Like a real pond, your pond-in-a-jar contains everything necessary for the plants and animals that live in it — except sunlight. All green plants, including the tiny single-celled algae in your jar, manufacture food. They absorb simple chemicals from their environment (the surrounding water), and using energy from the sun, change them into simple sugars, or food. This process is called photosynthesis. In addition, the



Teeming Life In A Jar

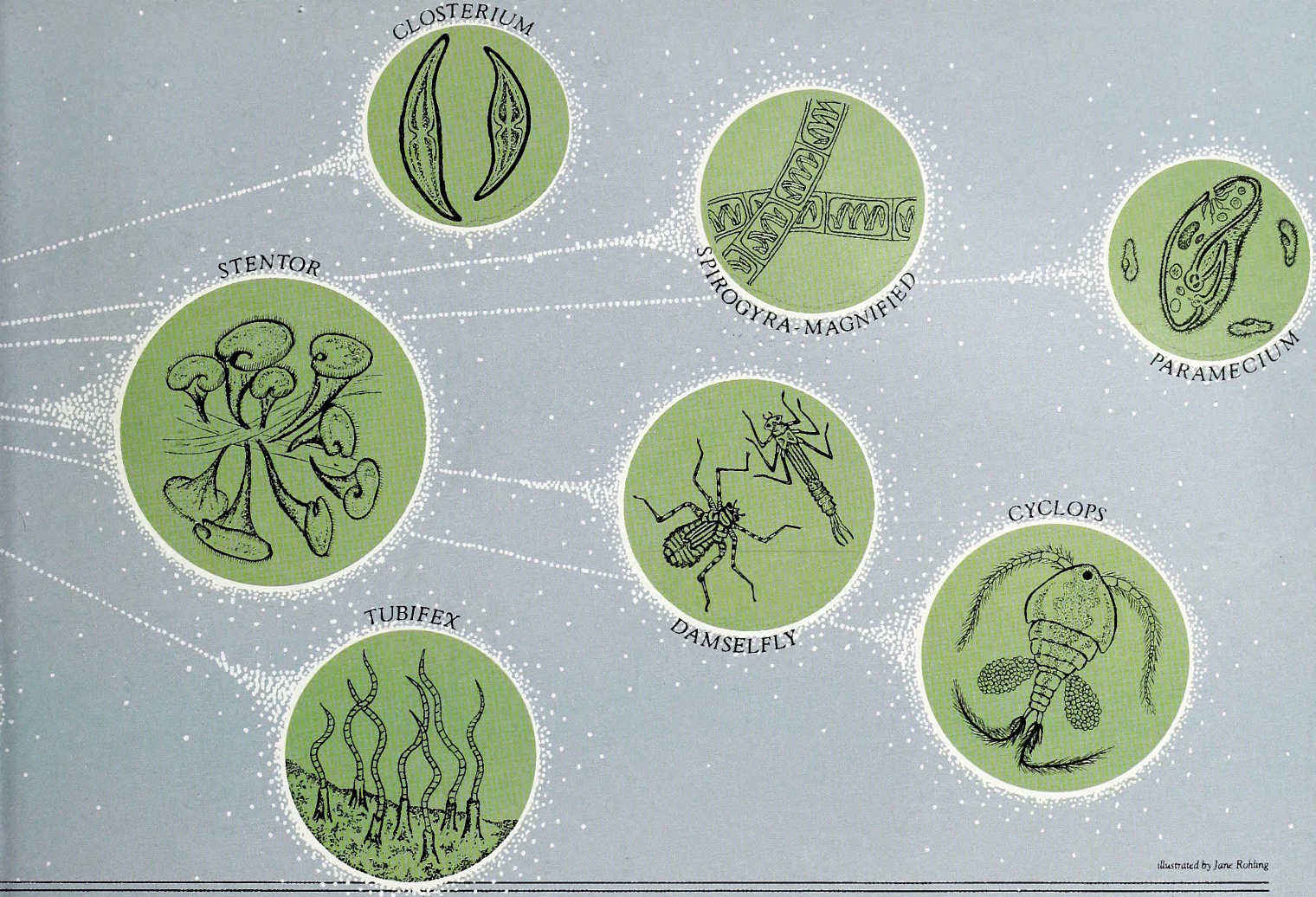
Algae are simple plants that form the green pond scums or the hairy growths on submerged objects (including turtle shells!). These plants are important as the base of all aquatic food chains. Long filaments of *Spirogyra* and the single, crescent-shaped cells of *Closterium* will probably be visible in your microcosm. *Spirogyra*, named for the spiral chloroplast in each cell, provides shelter for many other plants and animals.

Protozoa are animals that are microscopic, or nearly so. These single-celled animals are more numerous than all the other pond animals combined. Two common pond protozoa, *Stentor* and *Paramecium*, are bright green as a result of being packed with hundreds of one-celled algae. The algal cells produce simple foods and oxygen needed by the animals; the animals give off carbon dioxide needed by the plants.

Crustaceans, relatives of the familiar crayfish, are mostly aquatic scavengers that feed on plants. The eighth-of-an-inch ostracods, or seed shrimps, look like a cross between a clam and a shrimp and are especially common in pond vegetation and mud. The *Cyclops* is a copepod that lives in open water, seizing and biting their tiny prey. They are named for their single eye-spot, after the one-eyed giant of Greek mythology. They may be seen with attached egg sacs during the breeding season.

Worms will also wriggle around in your microcosm. Among them are tube-builders, like the reddish *Tubifex*, partially buried in the bottom mud, or colorless nematode worms with their constant whip-like thrashing motions. Leeches are flattened, segmented worms that move by "looping" — alternately attaching the mouth and tail suckers to the surface. Planeria, flatworms with blunt, rounded "ear lobes" and "cross-eyed" light-sensitive eyespots, are some of the most fascinating creatures you'll find in your microcosm. They have the ability to reproduce by dividing into two or more parts, each of which becomes a complete new animal.

Insect larvae or nymphs are the first stage in an insect's life. They are often abundant and make up an important part of the pond food web — both as voracious predators on smaller animals and as food for fish and other larger pond inhabitants. Mayflies, dragonflies and damselflies, mosquitoes, and beetles are among the many species of insects that may be found. Many of them look like segmented worms in their larval stages, but if you look closely you can usually see six tiny legs. Most of these larvae would not survive and should be released.



illustrated by Jane Rohling

plants produce oxygen as a by-product of photosynthesis which is used by the animals in breathing. Living animals give off carbon dioxide, one of the raw materials the plants need for photosynthesis.

Plants become food for plant-eating animals (called herbivores), and the plant eaters in turn become food for other animals (called carnivores). Animals and plants that aren't eaten eventually die and become a part of the soil and organic debris in the pond bottom, returning chemicals to the environment. This oxygen-carbon dioxide cycle is an important part of all living ecosystems.

Many of the plants and animals in your microcosm are too small to be seen by the naked eye. If you have access to a microscope, look at samples of the water mud and plant debris before sealing the jar. You'll be amazed at the number of fascinating organisms you can find in a single drop of pond water.

There are plenty of things that you will be able to see scurrying around in the water without a microscope, but a good magnifying glass is necessary to see much detail in the smaller critters. The magnifying glasses sold in most stores are usually about 3x magnification. These are not very helpful, but are better than nothing. I recommend buying a magnifying glass made for looking at photographic slides or negatives. They cost about the same amount as other magnifying glasses (about $5.00) and give you 8x magnification. They are available from camera stores.

This is a perfect way to study pond ecology right in your home. You can watch for seasonal changes, test the effects of changes in light and temperature, or see how many different plants and animals you can identify. You should put a label on the jar with the date that it was sealed on it, and perhaps keep notes on changes you observe over time. You may also want to mark the original levels of mud and water to see if these change.

Here are a few pointers to remember: Direct sunlight is not necessary and in fact, is harmful to your microcosm. Most pond organisms thrive best in fairly cool water, 70 degrees or less. The water in your closed jar will heat up quickly with no way for the heat to escape, like the inside of a closed car. A north window is probably ideal.

If the water becomes green too quickly with algae, cut down the amount of light by moving the jar to a different location or masking the side of the jar toward the light with paint or paper on the outside.

Try to keep the jar in a place with a fairly constant temperature. Rapid or radical changes in temperature could be harmful to some of the organisms. Sixty to 70 degrees is best. You'll be able to see much better if you place a bright light behind the jar while you make your observations. Be sure not to leave it on too long or it may heat up the water. Watch to see if any of the animals are attracted to or move away from the light.

Two excellent books on pond life are *Pond Life,* a Golden Guide book which sells for $1.95 at most book stores, and *The Life of the Pond,* part of the McGraw-Hill series called Our Living World of Nature. Another interesting book with chapters on planarians, hydra, pond snails and water bugs is a paperback called *Pets in a Jar,* by Seymour Simon, published by Puffin Books.
If the book store doesn't have these, they should be able to order them. Also, these and other books on pond life may be available at your local library.

William Kostan

Struggle for existence ends in death for the frog, continued life for the water snake. Such transactions are daily fare in the pond ecosystem as the sun's energy is recycled from vegetation to prey species to predators.

Sometimes the ability to stay one step ahead of a predator is not enough to guarantee the next meal.

Survival In The Pond

by Lawrence S. Earley

From a certain point of view, a five-acre pond is a vast arena featuring startling scenes of mayhem. Consider the green heron, prowling among the lily pads. It stops and suddenly spears a mosquito fish nibbling at the surface. The look in a green frog's eye, as the gossamer-winged dragonfly flits closer and closer, is surely not one of admiration. Z-i-i-t! A pink coil of tongue and the dragonfly is gone. Below, a 7-pound largemouth inhales a bluegill.

And then there are the predatory insects. Imagine an inch-long diving beetle as it hangs upside down from the surface of the pond refilling the "scuba tank" bubble of air it carries below its wing cases. Spying a minnow below, it dives, siezes it in its jaws and tears it apart. Meanwhile, scuttling below, the water tiger, the diving beetle's larval form, knifes into a tadpole with a pair of crescent-shaped jaws and sucks the vital juices from it.

Yikes!

William Roston

Jack Dermid

William Roston

It's enough to make the hair on the back of your neck stand up.

That's why it's refreshing to talk to someone who has an entirely different way of looking at predation in a pond. Meet Sam Mozley, freshwater ecologist, student of ponds. At Yates Pond in Wake County one morning we stood together at the end of a 25-foot dock talking about life in a pond.

Mozley looks at ponds and other ecosystems as a web of plant and animal life connected in intricate and complex ways. To him these deaths are just ways that energy gets passed around in the pond. It all began when sunlight was trapped by photosynthesis in a piece of vegetation. Transformed into sugar, the energy was captured by insects and fish as they ate the plant. Moments after a water bug slurped up a frog, a bluegill might have swallowed the bug. And when the bluegill made an ill-advised swipe at my white Beetlespin . . . well, there on my hook, by a series of energy transfers, is a little piece of the sun.

In his classes at N.C. State University, Mozley, an associate professor of zoology, talks about "stable" and "unstable" ponds. He finds that they are useful concepts in teaching his students how changes in the pond environment can affect the creatures that live there.

Which is why we are at Yates Pond. The pond was originally built in 1750 by Samuel Pearson to provide power to drive his grist mill. That's fairly typical of the ways that early ponds appeared in North Carolina. There are now more than 80,000 ponds in the State, but except for pocosins and bay lakes none of them are natural. The glaciers that scoured thousands of potholes, ponds and lakes across the northern half of the continent never got this far south. Most of our ponds were dug to provide irrigation or to water cattle. Others like Yates, are little bulges in streams, the handiwork of men and beavers.

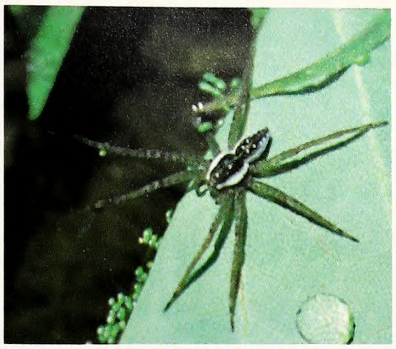
Yates Pond is also typical of ponds in that at about 20 acres it's small and shallow; at no point is it more than 12 feet deep. These are usually the characteristics that distinguish ponds from lakes. Yates has a good variety of plant life, ranging from macroscopic algae floating on the surface, to cattails, smartweeds and water lilies fringing the shore. About 18 species of fish are known to swim in its waters, and there are a large number of smaller animals including floating zooplankton, insects, bugs and amphibians that inhabit the four zones of a classic pond — both sides of the water surface, the open water area, the mud bottom, and the area in and around the aquatic plants.

But Yates is an unstable pond, says Mozley. After every rainstorm sediment from eroded fields and cleared land upstream pulses into the pond, turning it a muddy brown and inhibiting plant growth along the bottom. The water level rises and falls radically, causing some aquatic plants along the shoreline to die and exposing the mud to baking sun. These erratic conditions cause repercussions throughout the pond's web of life.

A stable pond is generally clear, and its water level has less severe ups and downs. Forested land upstream and vegetated stream banks hold back the erosion that causes turbid water. As a result predator-prey relationships are allowed to develop normally. In such a pond predation is the main law of the land, determining what species will survive.

"Predation is an important process in the structuring of animal communitites," Mozley said. "We know that most communities contain animals that are adapted to each other so that the prey can withstand the effects of the predator and lose a tolerable number of their offspring, and yet maintain survival of the population."

He bent down and pulled up a floating stem of spatterdock out of the water. A dull green slime covered the stem. "Algae," he said. "It grows attached to the plants. Most of the time if you pick up a plant leaf you can rapidly see that it's covered with an algae slime. It's a very rich source of food for the forage organisms on which fish depend." In a stable pond system, he continued, one which is clear down to the bottom and where the water level doesn't change radically, these plants and their algae will grow profusely. They'll offer new habitats for tiny insects and other fish forage organisms which easily adapt to these habitats. For example, many damselflies and dragonflies lay their eggs inside the plants. A variety of beetles, moths and flies feed on the plants. Some mayflies, midge larvae and sideswimmers feed on the algae. Fish feed on all of them.



Kay Frazier

Jack Dermid

Beaver Pond Swarms With Life

The web of life in a pond begins with plants. Magnified 100 times, diatoms float in the pond water (near left). With other algae species, these microscopic plants form the plankton soup consumed by fish and insect alike. Above and below the surface, hosts of carnivores await their prey. Motionless on the leaf of a floating plant, a fishing spider watches for a tiny fish to approach. Pressed to the surface, the bullfrog looks for insects. The giant water bug (above) will grasp tadpoles and small fish in its formidable jaws and suck out their juices.

But not all of the creatures that can adapt to these habitats will actually do so. "What is found in a few experimental cases," Mozley said, "is that when these aquatic plants are present with an abundance of fish, the prey that inhabit the plants are small-bodied organisms — those which have very secretive habits, which live in notches of the leaves, which don't move around on the surface of the leaves very much unless they are extremely tiny." Species like small insect larvae, seed shrimp no longer than a tenth of an inch, copepods and other things too small or secretive to be seen by fish. If the organisms are larger or more active, the fish will eat them.

This is a good example of the kind of balance that occurs between aquatic predators and their prey, the adaptations and adjustments that pond animals make to each other in order to survive.

"But what happens if you remove predators from this equation?" I wondered aloud. "What kind of adjustments do the prey species make?"

"Changing the kinds of predators or their numbers has a dramatic effect on the prey populations," Mozley said. "We can see strong shifts in the composition of prey species. That's been demonstrated in recent years again and again."

He pointed out that it's been well known that if the largemouth bass were removed from a pond containing bluegills, there would be more bluegills but smaller ones. On another level, removing the fish from the aquatic plant beds causes the prey species found there to change. Suddenly larger invertebrate predators begin to appear — dragonfly nymphs that grasp their prey with jaws at the end of a "hinged" lower lip, diving beetles, backswimmers, water scorpions and giant water bugs who all cling to the water surface. Amphibian predators like frogs and salamanders may show up because they are no longer threatened by the fish and more food is available. "All these creatures now control the structure of the prey populations so that prey which were once small, and better off being small, so the fish would ignore them — now they must be big enough to avoid being eaten by the invertebrate predators."

But being the right size at the right time is only one of the ways that pond animals have to survive in the teeth, so to speak, of predators. Highly elaborate hiding mechanisms are also of great value. "Predation may lead the caddis fly larva to clip algal strands and construct a slightly conical tube within which the caddis larva can hide. And this may deceive all sorts of fish, and prevent heavy predation on the caddis fly larva." The phantom midge larva, aptly named, hides by being invisible to many kinds of predators. The half-inch creature that swims up and down in the water is perfectly clear except for a couple of black spots.

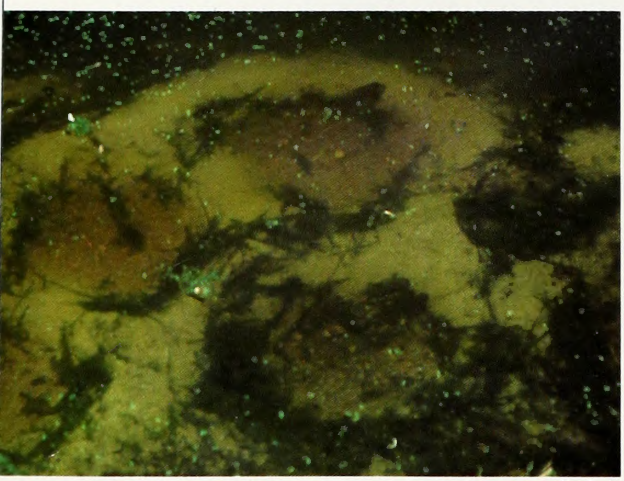
Pond animals can also avoid predators by shifting the time they reproduce. Copepods, for example, are small crustaceans that feed on tiny water fleas. "In order to use that food resource," said Mozley, "they must reach maximum size just before the water fleas begin to reproduce. So their life cycles are adjusted to the life cycles of the water fleas — they have to be big enough to handle the water fleas just when they are ready to reproduce." Adjusting to this, some water fleas have developed the ability to reproduce a little bit earlier, before the copepods have reached the maximum size, or a little bit later, after the copepods have died out. Similar adaptations have occurred with stone flies and some mayflies which grow primarily in the winter because fish don't feed in winter.

I pondered all this and then tried to sum up. "So in a stable pond predation is the main pressure on creatures, forcing prey to adapt to their predators through complex avoidance strategies."

"And the more predators in a pond," continued Mozley, "and the more *kinds* of predators the more diverse the prey and the more balanced the pond populations will be."

A spattering of rain began to pock the slate-colored surface of Yates Pond as we talked, and we walked back along the dock to the protection of the trees. "I suppose this rain is not such a good thing for Yates because it'll bring more sediment in from upstream and make it even more turbid. Why is turbidity such a problem anyway?" I asked.

"Turbidity affects pond life in at least a couple of ways," Mozley replied. "First of all it inhibits the penetration of light through the water quite severely. One result is that the heat of the sunlight absorbed by the water is



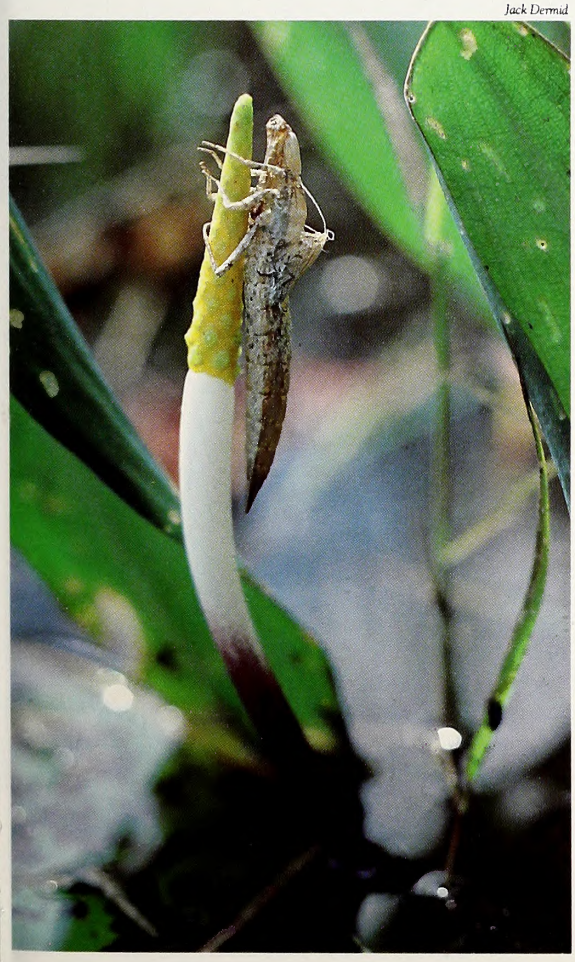
Kay Frazier

Upstairs, Downstairs

While a painted turtle basks on a log near a water lily, a tiny frog is engulfed below by a largemouth bass (far right), another episode in the daily drama of pond life. Dried exoskeleton of a dragonfly nymph (below right) clings to an emergent plant. This nymph is one of the fiercest aquatic predators, but is a tender morsel for a fish. Bream spawning beds (above) are the start of another generation of fish.

Jack Dermid

Jack Dermid



William Roston

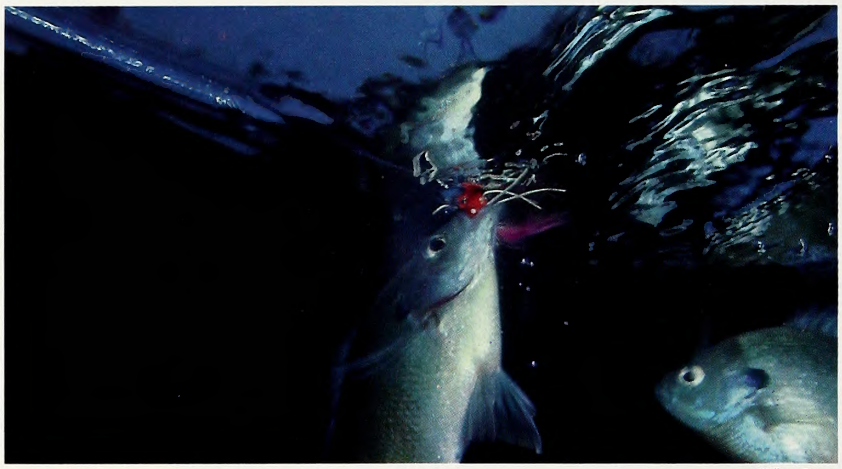
concentrated in a much shallower layer because the rays hit sediment particles and tend to bounce horizontally." This tends to make turbid ponds hotter at the surface.

"The other effect of shallower penetration of sunlight is that algae, which produce oxygen and release it to the water, are prevented from growing at greater depths. In a pond like Yates, oxygen in the deepest layers can be exhausted in three or four days." The result is a crunch for fish. They can't get oxygen by going down to cooler water below, and they are overheated if they come to the surface to get oxygen. Fish can die in these circumstances, and in August and September they often do. Even if conditions are not lethal, the fish are forced to concentrate in such a narrow layer that they are

more vulnerable to predators.

Turbid water has also been seen as causing stunted growth in fish, although the reasons are not quite clear. "Most of the fish — largemouth bass, crappie, and bluegills — are primarily visual predators. They're not as effective filter feeders as some shad, which go through the water and strain out everything above a certain size. Shad have no problem in turbid water. They don't have to see what they're eating. But the visual feeders must see their prey and the turbid water makes that much more difficult." Some of the stunting in prey fishes may result from the reduced control by top carnivores, and by overcrowding. Of course the elimination of the best fish forage organisms may also cause stunting.

Turbidity is responsible for changing the kinds of fish that live in the pond. "A pond that alternates being turbid and clear as every rainstrom washes in fresh mud affects some of the fish more than others," said Mozley. "It doesn't affect largemouth bass very much or bluegills because we know they can be quite common in turbid ponds. And carp, catfish and bullheads feed by smell and so they are not affected.



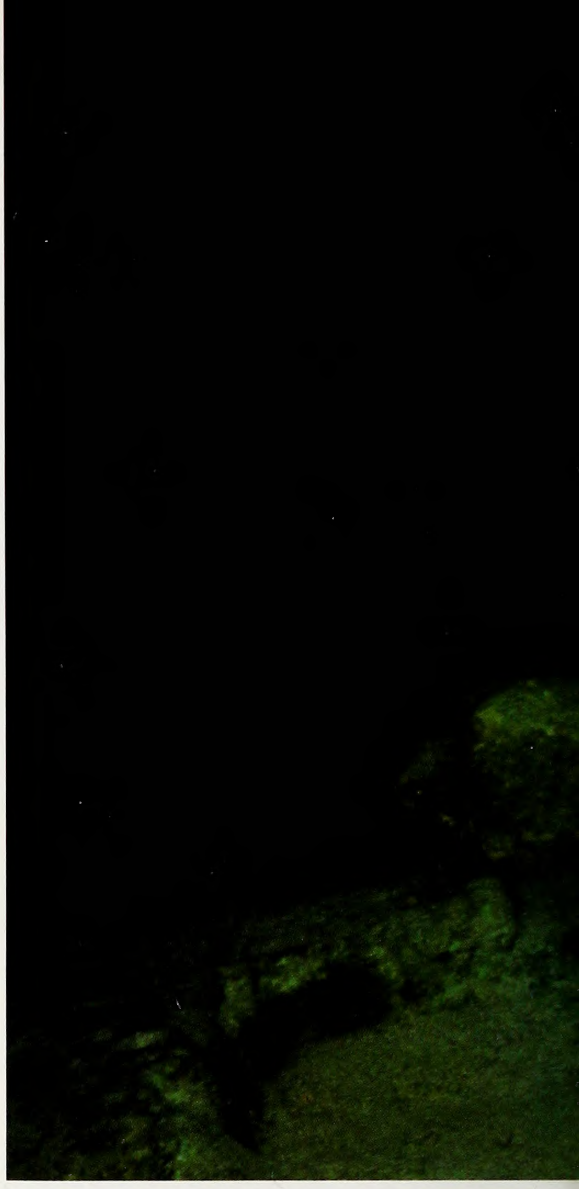
William Roston

"But it may affect some of the other species which are less commonly distributed. Warmouth, for example, are often found in clear ponds but rarely in turbid ones." In the absence of bottom-feeders like sunfish, one or two of the forage organisms which had been kept in check by the fish tend to dominate the bottom. Perhaps they are a little larger than other organisms, or more mobile. Whatever the reasons, with no fish to keep their populations in check, they compete better for the available foods and come to dominate their community. "A community dominated by one species," said Mozley, "is a simpler community with less room for other species.

"Physical instability disrupts all the biological adjustments in a pond and favors two things: a wide tolerance to all sorts of environmental fluctuations — in terms of the ability to tolerate a wide range of water temperatures, water transparencies and food resources — and a rapid rate of reproduction. If a species has these characteristics it will do well in a pond that is unstable."

One little species that does very well in Yates Pond is the phantom midge larva. Its abundance in Yates Pond tells Mozley as accurately as if he were using sophisticated measuring instruments that the pond is extremely unstable and has an oxygen problem. Aside from being nearly invisible to many predators in turbid water, the phantom midge larva is able to cope well with the lack of oxygen in the pond bottom. "It can control its buoyancy, drift up near the surface at night to feed on the animals suspended in the water and then, to avoid fish, sink down to the bottom during the day to hide in the muds." The female may lay several hundred eggs so that when predators are inhibited, the phantom midge can increase nearly a hundred-fold in one generation.

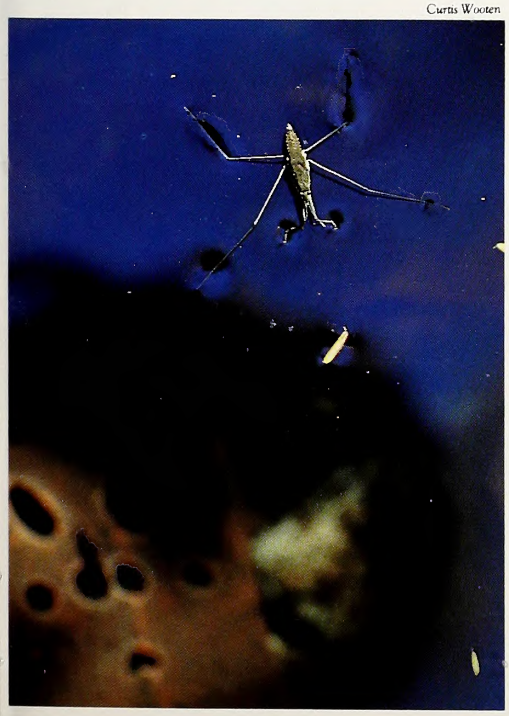
"Because of its high reproductive rates the phantom midge larva takes over and presumably eliminates many potential competitors. This creates further changes down the line." The larva so totally overwhelms its prey



Eat And Be Eaten

Pond's surface tension can support a skating water strider (bottom right) as it searches for fallen insects. An angler's artful lure imitating a surface insect can sometimes tempt a bluegill into a strike (above), while elsewhere, a bass gobbles up a minnow (top right). Predators control prey populations in a pond, creating a natural balance between predator and prey and ensuring enough food for each. Unstable conditions, like turbidity, can upset the natural balance, favoring species that can tolerate the changing environment and reproduce quickly.

William Roston



Curtis Wooten

communities, that the kind of balance between predator and prey that is seen in stable ponds is missing. The pond is impoverished.

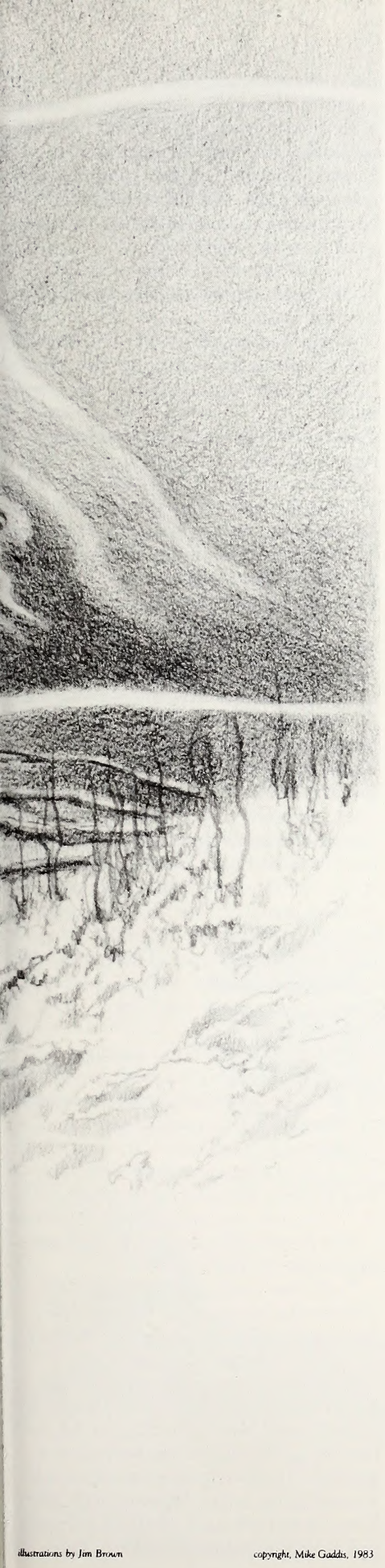
So as a result of turbidity and fluctuating water levels, there are shifts throughout Yates' ecosystem. Phantom midge larvae are present in great numbers. Fish may be present, but they may not be quite as diverse as they would in a clearer or more stable pond, and they probably will not be as productive as they are in clear water systems.

The rain had stopped by now and we wandered the shoreline looking at a few of the experimental stations that North Carolina State researchers were setting up. Near the old mill, large gears that once drove the grist mill were rusting away. Before we left we listened to a bull frog sound his immemorial challenge and watched as a red-winged blackbird chased a dragonfly.

"So," I said, ponderously trying to sum up what I had learned about ponds, "the law of 'eat or be eaten' isn't that important in Yates Pond."

"Things are a little off in a pond like this," said Mozley. "The physical challenges to the survival of all the organisms are so severe — problems of overheating, deoxygenation, and limits on plant productivity on the bottom — that there are only little pockets here among the plants where 'eat or be eaten' is the main law of the land. The animals here tend to be survivors, those that can weather the severe conditions and then flood the system with their offspring.

"But as a result it's just not as interesting a system as stable ponds. Stable ponds are complex and fascinating habitats. Unstable ponds are . . . well, let's face it, they're boring." ⇳



illustrations by Jim Brown

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Hunting For BASS

You can't catch bass consistently unless you know how to find them—and then know what to do next.

by Mike Gaddis

"Great day in the morning!" This was Jerry Mills, and he was right. It was about to be.

We'd been studying topo maps and cruising likely spots since shortly after dawn, fine-toothing every foot with the depth finder. It had worn into eleven o'clock of a mid-August day. It was a slow go looking for an open-water bass sanctuary, that something special that would hold the kind of fish we were after. Now things appeared to be improving.

Jerry swung the boat in a tight 180 and attempted to retrace our recent course. He had temporarily lost the object of his exclamation. It took three more passes to regain it. When he did, we were both spellbound with excitement.

Coming out of 65 feet of creek channel, the depth finder image separated into a broadening band, bouncing up a tight ascent to a high spot 15 feet under the surface and 30 yards off the channel. As quickly, it fell off the shoreline side 25 feet deep, then soared again to indicate the pinnacle of another peak only 9 feet under the boat! Bits of signal were ricochetting wildly above the bottom line, a giveaway for heavy cover. Maybe rocks and brush in combination. And here and there was a blip that had "fish" written all over it. The second peak was no more than 20 feet across, sitting in the middle of nowhere, 500 yards from the nearest treeline. Classic summer "structure!"

We caught 13 fish there in the next hour, starting on the shallow peak and easing gradually across the second into deeper water. They ranged from 2 to 6 pounds, with half between 3 and 6. We lost others in the heavy cover. Good fishing, but not beyond reach if you know what you're doing.

In the meteoric rise of popularity that bass fishing has seen in the last ten years, a lot of new terminology has been hung on some old things. That's usual when a sport specializes. Neither is it unusual for the buzz words to be known by all, but understood by few. In many ways, it seems, structure fishing is that way. Bass fishermen were fishing structure long before the term was coined, long before depth finders made the scene. Buck Perry of Hickory was ahead of his time in this regard with his spoon plug techniques and his theories on bass migration.

While most everybody knows the word, there are a lot of bass fishermen in rare humble moments who will confess that structure fishing is an enigma. It's easy to become intimidated and miss out on some of the fastest and most gratifying moments bass fishing has to offer. But if you pound the bank all season, particularly from June to October, you're turning your back on some tactics you need to know.

While in many ways it seems presumptuous to cover a subject that has been beat around so much by so many, I am convinced that there are some practical "secrets" that are little known, or not conscientiously attended. A large part of fishing success is paying big attention to little things. Compare notes with me.

In the general sense, structure is any physical feature, natural or manmade, visible or submerged, that has the potential for attracting or holding fish. It can be willow-tops or standing dead limbs, commonly called "stick-ups," fallen tree laps on a deep shoreline, bridge pilings, an underwater stump bed, a deep rocky point, the pilings supporting a boathouse, a standing cypress tree, or even an old boat that has been moored in a good spot for a while. It can be temporary — here today, gone tomorrow — though most good structure has some permanency. It's proper to think this way; it keeps you from getting careless and overlooking something that might turn a fish. It also helps to remember and make use of the fact that the size of a body of water is not the limiting factor. I've seen fishermen come off big water and forget that fact when it would help. Structure can be a stump on the edge of a spring hole feeding a two acre pond as easily as it can be a rock pile on a creek confluence, 25 feet below the surface of the most massive reservoir in the State. Each has high potential for bass.

In the contemporary sense, though, structure fishing means fishing around submerged objectives on the big water during the summer months after some temperature stratification occurs and the daylight period is maximum, driving the fish to deeper water. Most commonly, it's associated with reservoirs like Fontana, Norman, Tillery, Badin, Kerr and Gaston. These are the sprawling hydroelectric impoundments that leave a lot of people lost after the bass vacate the shoreline and visible cover, sometime around June or July.

It's understandably awesome, yet it's also predictable that when bass move to the deeper water they will establish holding and feeding patterns, often in schools, and in equally predictable locations. With some sleuthing, these locations can be found. That's what structure fishing's about, and when you manage to get everything together, it leads to some fast, quality fishing!

The places that tend to congregate bass are classified by structure fishermen according to their relationship to the patterns the fish have adopted. So this has led to terms like feeding areas, holding areas, "migration" routes, schooling areas, and ambush points. What these terms mean may vary, but here are some examples. A feeding area may be an expanse of dead willow brush on a sloping point 13 feet down, leading to a dropoff into deeper water. A holding area may be standing timber in 25 feet of water at mid-day or a rough U-bend in a creek channel. A migration route could be the ditch of an old roadbed that ultimately terminates in a baitfish concentration in shallower water, while a schooling area may be open water near a high spot that serves as a casual feeding ground. An ambush point is likely to be a brush and rock-covered ledge at 9 feet at dawn where baitfish frequent.

You can get a start on finding likely places such as these by obtaining topographic maps of the lake you're interested in. These are available at modest cost from either the regional office of the Army Corps of Engineers or the main office of the utility company concerned. Topo maps show the general underwater features of a lake and their depth. Contour lines, usually at 10-foot gradations, are the key to this. One of the most important aspects to structure fishermen is rate-of-slope, or how quickly the bottom changes from shallow to deeper. When rate-of-slope is abrupt and dramatic, you get "drop-offs," probably the single most important indicator.

Topo maps are a definite advantage. They cut down on looking time significantly. Do not, however, expect them to be the automatic key to every piece of good structure on a lake. The two best places I know on Kerr Lake aren't discernible on their respective area sheets, although they are near promising-looking locations. You can use the maps to identify promising locations generally, though you should expect to do a lot of fine-combing when you get there.

Generally, you would have to say that a good, high-speed depth-finder like the Lowrance Eagle Silent 60 or Hummingbird Super 60 is indispensable on the big waters. The high-speed feature means it will maintain signal integrity at high boat speeds. This is important when you're making a 10-mile run between two objectives. You may get a windfall as Jerry and I did. Remember, everything's not going to show up on the topos. For smaller waters like ponds and municipal water supplies, a portable, slow-speed model will do fine. Or you can feel out an area with the anchor rope. We found creek channels that way long before we had depth finders.

There are a few exceptional fishermen around who do pretty well on the bigger waters without a depth finder. Usually, these are men who have fished all their lives and had to manage long before depth finders made the scene. There are things you can learn from them.

Tom Thaxton is one fisherman who had to scope it out for himself in the predepth-finder days. He guided on Santee-Cooper in South Carolina for a number of years, and has fished North Carolina reservoirs since the 1950s. He is good on open-water fishing.

Tom never minced words about anything. He had a cardinal rule about structure fishing.

"If that bottom ain't rough as a shagbark hickory, you're wasting your time."

He was right on the money. Experience has borne this out time and again. Some of the prettiest contour around, on a map or on a depth finder, is as smooth as a baby's bottom, and largely unproductive. It needs to be rough, the rougher the better. If you lose three rigs through hang-ups in 30 casts the first time you fish a promising place, the odds are you caught fish on a high percentage of the others, or had a chance.

Let me add one more thought from my own experience. See if you agree. On any likely structure, look for the one thing that's characteristically different from the rest of its features. An underwater drop-off may fall from 15 to 30 feet in a double-cast distance from the boat along most of its length and have fairly decent cover on it. Then, abruptly, it will make the same descent in a single cast's distance and be so rough you can barely drag a lure through it. It may be this way for only 12 feet of a 100-foot perimeter, but that's where the fish will be — both the biggest and the most. Look for that special difference, the most dramatic feature it offers. A piece of structure has to have this to be outstanding.

If you want to put it in a package, I believe the following is a good, general rule for locating outstanding structure. Look for the most abrupt, dramatic changes in topography you can find. If it doesn't have heavy cover relative to its surroundings, keep looking. Stay in a depth range of 10 to 35 feet, but near deeper water. Maintain a sense of relativity, because in large part, that's what it's all about.

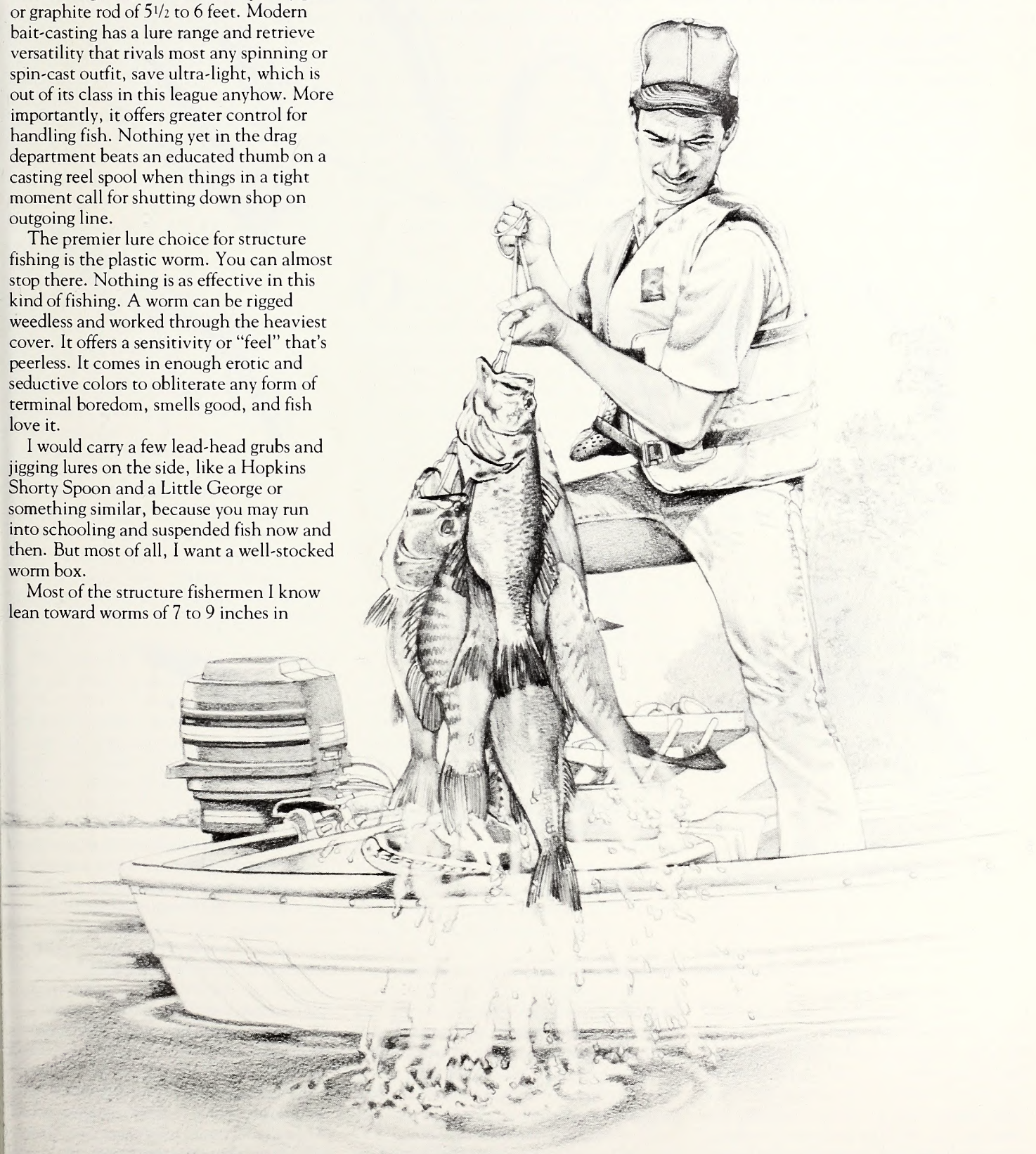
Tackle for working structure should consider the nature of the fishing. The heavy cover calls for lines in the 14 to 20 pound test category and a rod and reel combination that has the response and backbone to put pressure on a fish in quick order. I lean toward 17 to 20 pound test because you're going to get lures hung a good bit. The heavier line can also stand more abrasion and still have enough left to hoist a heavy fish free. You have to expect and be willing to lose a lot of rigs, even

with the heavier stuff. Spinning, spin-cast, or bait-casting tackle will do, though the nod would have to go to a good bait-casting reel, matched to a quality glass or graphite rod of 5½ to 6 feet. Modern bait-casting has a lure range and retrieve versatility that rivals most any spinning or spin-cast outfit, save ultra-light, which is out of its class in this league anyhow. More importantly, it offers greater control for handling fish. Nothing yet in the drag department beats an educated thumb on a casting reel spool when things in a tight moment call for shutting down shop on outgoing line.

The premier lure choice for structure fishing is the plastic worm. You can almost stop there. Nothing is as effective in this kind of fishing. A worm can be rigged weedless and worked through the heaviest cover. It offers a sensitivity or "feel" that's peerless. It comes in enough erotic and seductive colors to obliterate any form of terminal boredom, smells good, and fish love it.

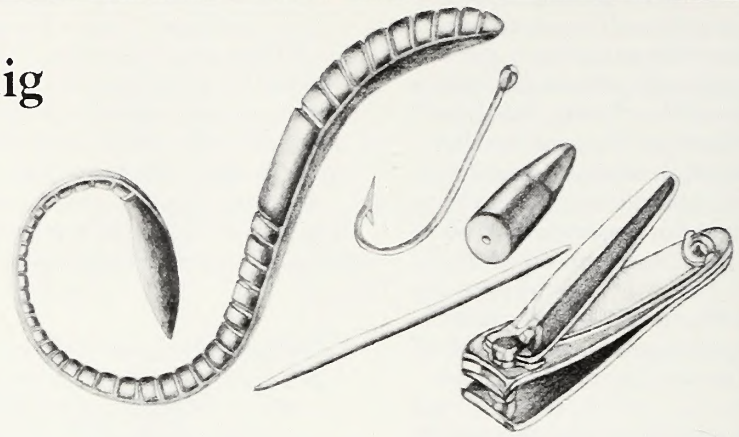
I would carry a few lead-head grubs and jigging lures on the side, like a Hopkins Shorty Spoon and a Little George or something similar, because you may run into schooling and suspended fish now and then. But most of all, I want a well-stocked worm box.

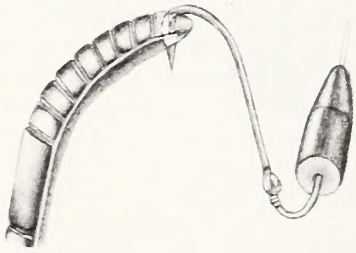
Most of the structure fishermen I know lean toward worms of 7 to 9 inches in



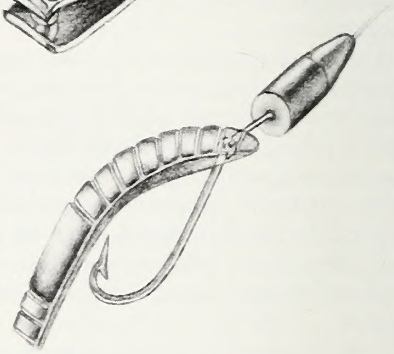
The Texas Worm Rig

Though smaller plastic worms and hooks can be used, the standard size for big bass on summer structures is a 9-inch plastic worm and a 5/0 hook. You'll need a sliding lead sinker (usually 1/2 to 1 ounce), a round toothpick, and nail clippers. Hooks should be sharpened with a small automobile point file or whetstone.

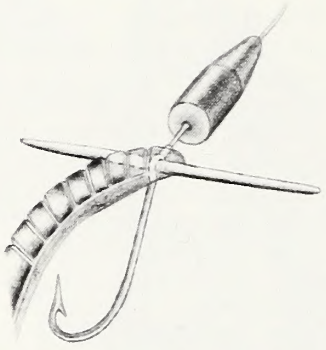




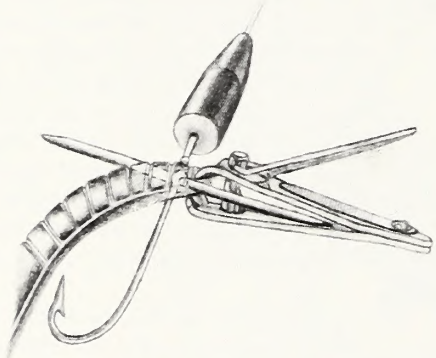
1) Slide sinker on line, tie line to hook eye, then insert hook point into head of worm about 1/2 inch and bring point out as shown.



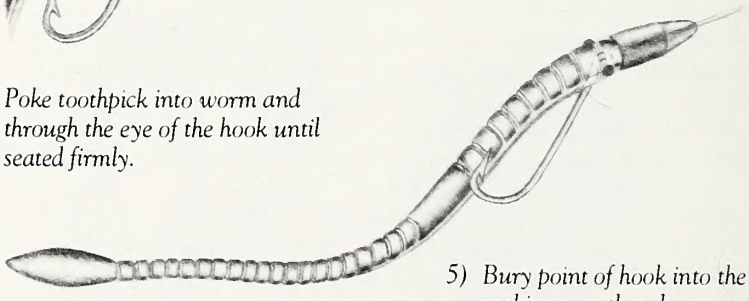
2) Pull hook through until eye of hook and knot are buried in the head of the worm. Make sure hook point is facing the worm as shown.



3) Poke toothpick into worm and through the eye of the hook until seated firmly.



4) Clip off both protruding ends of toothpick with nail clippers. Toothpick keeps worm from sliding down the hook shank when you cast.



5) Bury point of hook into the worm, making sure that the worm is straight so that it won't spin and twist line when you cast and retrieve. Rig is now ready for fishing.

length. Color is a much debated factor, but there's no reason anyone has to go wanting. They even make them with a metal-flake effect, to match the deck of your fiberglass boat. It does get confusing when the question is which is best for catching fish. Hardly a week goes by that someone doesn't tell me he slew the bass with some new flavor, like pearlized black. It all sums up this way. Experience, and your experience alone, will tell you what to have the most confidence in. If you're good, you stay open-minded, but I will make this observation. It seems that when the chips are down, most of the best fishermen I know throw the darker shades, particularly in blue, black, and purple.

Which worm to choose based on physical appearance is also a problem. All the variations on the straight, full-bodied worms attempt to achieve some special action when fished. The array is mind-staggering. There's the Squirmin' Worm, the Snake Bait, Jelly Waggler, Auger Tail, and Gator Tail, and that's just a start. Just remember this. The action that's going to count most with any worm is the action you give it through the rod at the precise moment it bounces over that piece of top-flight bottom cover.

The best way to rig a worm for structure is Texas Style, with a sliding worm weight above it. It's not new by any means, but

well-proven. I'd recommend a 5/0 hook. They come in various designs, with two things primarily in mind — keeping the worm on and hooking success. I personally prefer the Eagle Claw 295XBL, which has a straight shank and rounded bend. I tie it on with a uni-knot and keep the worm in place with the tip of a round toothpick through the eye, clipped off on each side of the worm with a pair of fishing clippers.

In threading the worm on, push the barb into the head and follow the center of the body for about a half-inch or so, then bring it out the side and pull the eye down just into the head. Now turn the hook so the point is facing the worm and embed it, again in the center, with the point of the hook not quite through the worm. This makes it weedless. Try to complete this procedure so that the worm hangs straight on the hook. Otherwise, you'll get line twist. Incidentally, slide the weight on the line before you tie the hook on. It's the easiest and most aggravating thing in the world to forget.

Fishing a plastic worm is a skill only experience can hone. A general rule for structure is to let it sink to the bottom before beginning the retrieve and then fish it back slowly. Be careful when you first start to reel because fish often pick it up on the way down. As you bring it back through good cover, work that rod tip! It makes the worm bounce and flutter. Now's when it counts!

The biggest single secret in worm fishing is to stay alert. In deeper water, the strike of a bass may be almost imperceptible because of longer casts and more slack line. It won't be the sharp tap that usually signals the strike when there's direct rod-lure contact. Watch the loose line lying on the water after each cast while the worm is settling. Sometimes you can see it twitch slightly when a fish gets on. In a moment or so the line will begin to straighten out and tighten as the fish moves off. Other times, a fish may pick up the worm on slack line while you're working it, or simply pick it up off the bottom while it's at rest. When you start to tighten the line again, it'll just feel heavy. If you increase your resistance slightly by gingerly raising your rod tip, you can feel the fish nudging away, or a tap or two. "Feeling out" a fish is one of the things that makes worm fishing enjoyable. It kicks in another dose of anxiety and suspense because if you put on a hair too much pressure, the fish is going to drop it. That's particularly true now-a-days when they've had so much opportunity to become educated. One more thing, when you get ready to set the hook, let the fish take the slack out if possible, and set the hook like you mean it. Hard!

If you find what you think is good structure, but it doesn't produce when you first fish it, don't be too quick to write it off entirely. Try it again at a different time of day. One exceptional spot I know is only good before 9 a.m. It sits right in the middle of a boating thoroughfare and is only 9 feet deep on top. Bass won't stay in there when the traffic gets heavy. If you fish it at mid-day, it's lovely on the depth finder, but that's all. At another hole, I don't expect the school fish to arrive before 1 or 2 o'clock.

One thing that has worked well for me, when the transition in depth on a good hole includes two or three objectives at intervals, is to start with the shallowest one in the morning and with the deepest one in the afternoon. In the subdued light and low sun angle of early morning, fish concentrate on the shallower objective, so I back off it on the side opposite the drop where a long cast puts me on target. This decreases the likelihood of disturbing the fish, and when I catch one I can get him out quickly without churning up the place. Since fish normally hold on structure in numbers, it pays to get them out of the immediate area as soon as possible. Playing a fish leisurely in that situation is not only asking for trouble from wrap-ups, but scares other fish. As the sun angle heightens, fish begin to leave the shallower spot and migrate to deeper water. They'll usually tarry a bit at the next holding point, which is the deeper objective. When I sense this is beginning to happen, I'll ease out a little until I can reach it. And so on, until the cover is exhausted and the fish have left. In the afternoon, I reverse the process, fishing the deeper objective first and easing back as the fish move in. At dark I'm fishing the shallower one again. I love structure with such multiple objectives. It's highly productive.

I truly believe that the most overlooked and most critical factor in structure fishing is that on any good place, there's only one best boat position. Or you can call it an angle of approach. It's always the one that grants maximum "feel" of the available cover, and it's invariably the most productive. Don't just fish a proven piece of cover. Keep moving until you've established the best angle. Never be satisfied until you do.

This was really pressed home one day last year. I was perfectly aligned with the strike zone on the tip of a creek channel confluence in about 13 feet of water, breaking to 35. It put my casts over the most dramatic feature offered, a 10-foot expanse of rocks and stumps on the brink. I got another break that day too. It's one of the unique phenomena of structure fishing. You don't always have to go to the fish. They'll come to you. There was obviously a large school of bass holding in the channel a short distance away. They were easing in and out on feeding forays at 15 to 20 minute intervals. I sat in that one spot and caught 27 fish between 2 and 5 pounds from noon to four o'clock.

There were two guys in a Ranger fishing shoreline and mid-depth cover that day, up and down the two creeks. They watched me catch those fish until they could stand it no longer. They were within 30 minutes of the closing time on a club tournament and were "hungry." To their credit, they were polite about it. They shut down the big engine a proper distance away and came in on the trolling motor.

"What in the heck is out there," they asked?

It was one of those times when you get to act smugly as though it happened every day.

"Oh, not much. Just two creeks coming together and a big school of fish."

To add insult to injury, I was in a 12-foot Sears johnboat with a six-horse Merc on the transom, and using a portable depth finder.

These boys were sportsmen though, and after they explained their situation, I invited them to join in. In the next 20 minutes, they covered the area pretty well, and caught four fish from the school. I caught nine in the same length of time. I could tell they were pretty fair fishermen. But I was the one with the best boat position on that particular place.

Fish structure during the week if you can, about Thursday. It'll make a positive difference. Fishing pressure on the weekends is simply tremendous, and unfortunately there's a lot of piracy going on. You have to be sly.

I know one man who carries crappie poles as standard equipment. Not to fish for crappie, pray tell, but to look like he's fishing for crappie when he needs to. Every time a bass boat shows on the horizon, out come the crappie poles. It's backfired on him though. A while ago, he accidentally caught one of the danged things, and was immediately beset by 13 crappie boats. Turned out to be a Class A crappie hole. Now he's got a reputation. They follow him everywhere.

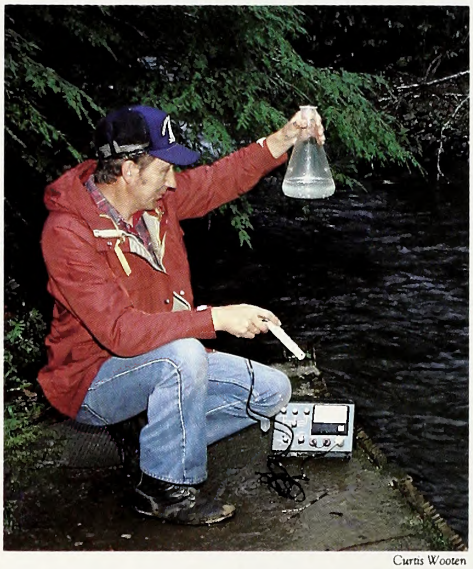
AERIAL Lumberjacks

by Curtis Wooten

Helicopters are being used in some logging operations with less damage to the environment, but the method is still controversial.

The WHOP-WHOP-WHOP of the big twin-rotor helicopter was a familiar sound for I had seen similar helicopters before — flying low over the marshes and coastal woodlands of Onslow, Pender and Carteret counties and fanning the needles of longleaf pines in the sandhills region around Ft. Bragg as they ferried Marines, Army recruits and equipment on military training exercises.

The helicopter, a Boeing-Vertol 107 in red and white civilian colors, rounded a ridge a quarter mile away, trailing beneath its belly two 40-foot logs on a 100-foot cable. Fifteen seconds later it had gently deposited the logs on the landing deck and was off again. Two minutes later it was back with two more logs — and two minutes later with more. A half dozen men scurried between trips, cutting the logs into sawmill lengths which were quickly moved aside by a loader. A stack of logs 15-foot high that stretched along one side of the landing grew steadily longer. The trees had been felled and trimmed of their limbs a couple of months earlier and the helicopter and its support crew were making short work of lifting them out.



Curtis Wooten

Helicopter logging, begun in the Pacific Northwest in the 1960s is new to North Carolina and the southeast. It has many advantages over conventional logging but three stand out: it's fast, it significantly reduces environmental damage and it makes possible the harvest of timber in previously inacessible areas.

This past winter, nine tracts of timber (six clearcuts and three thinnings) totaling 270 acres were logged on steep slopes in the Armstrong Creek watershed in northern McDowell county. Two and a quarter million board feet of high quality timber were harvested. Using conventional logging methods, had it been possible, it would have taken as long as three years to get the timber to the sawmill. Using the helicopter it took only three months. No expensive erosion-prone haul roads had to be built, skidders were not used and heavy logs were not dragged over fragile soil. The only place any appreciable amount of soil was bared was on the log landing and care was taken to control runoff there. Consequently, soil erosion and resultant stream sedimentation — the bane of most mountain region logging operations — were insignificant.

That should be meaningful to you if you are a fisherman, doubly so if you are a trout fisherman and triply so in this case because the timber sale was located just a few hundred yards above the Wildlife Resources Commission's Armstrong fish hatchery. Armstrong is the largest of the three state-operated trout hatcheries. Over a quarter of a million trout reared there are stocked in western North Carolina's public trout waters each year.

The Armstrong creek watershed, which supplies water for the Armstrong hatchery, is part of the Pisgah National Forest. It had not been logged since the early 1900s because conventional logging methods cause more soil erosion and resultant stream sedimentation than trout in the hatchery could tolerate. Even with the minimal impact anticipated by helicopter logging there was concern.

"We didn't know what effect the logging would have on the chemistry of water coming into the hatchery," said Howard Hembree, a fisheries technician at Armstrong. "That is, we were uncertain about how much change in water quality — the pH, dissolved oxygen content, water clarity,

Curtis Wooten

It's up and away as a twin-rotor Boeing-Vertol helicopter hoists a cut log from the steep slopes of a McDowell County forest. Logging by helicopter is costly but fast, and it reduces the sedimentation associated with most other logging methods. Fisheries technician Howard Hembree (left) tests water clarity along Armstrong Creek.

mineral content and other parameters — would take place and how much change trout concentrated in our raceways could withstand. Increased mortality, problems with disease control and changes in growth rates all were possible.

"In order to document changes caused by the logging we started taking water samples monthly and after each storm in 1980, two years before cutting began, and will continue them for two more years. Once the results are in we'll try to relate water quality changes to any deviations we observe in trout production." Hembree says that precautions taken by the Forest Service and Henessee Lumber Company to control erosion at the log landing and helicopter maintenance site have been effective, and that sediment-related problems in the hatchery, even with the heavy rains this spring, have been fewer than expected.

Given the preliminary success of logging one of the State's most delicate areas with minimal adverse inpact, you might wonder if logging by helicopter has any shortcomings. There is one — a big one. Cost!

Columbia Helicopters, the company handling the Armstrong logging operation, gets around $165 a thousand board feet to bring logs from the mountainside to the log landing. Lifting up to 11,500 pounds per trip, the helicopter is capable of moving more than 100,000 board feet of timber a day. A little math reveals that the daily cost of helicopter logging is not to be taken lightly. A high volume of quality timber is required to make the use of a helicopter practical for logging in North Carolina. In the Armstrong sale quality red oak and poplar, woods that are in high demand by the State's furniture industry, were harvested. But even with the high quality and volume, the timber sold for only a bit over $5 per thousand board feet, average. That's only slightly above the base price set by law for which timber from public lands can be sold. Had it been on even moderate slopes the same timber would have easily brought $60 to $70 per thousand.

"The real economic value is in putting the timber into the local economy — in hauling, in sawmills, in the furniture industry," said Pat Cook, the District Ranger for the U.S. Forest Service's Grandfather Ranger District. It was Cook's office that supervised the sale. "From a management standpoint, the sale allowed us to thin and regenerate timber stands that we wouldn't have been able to reach otherwise, and to utilize a research that would have been wasted."

Despite the advantages of helicopter logging, some questions have been raised. The technique is so effective that some fear that formerly inaccessible wilderness areas, which approach virgin-timber status, may soon be opened up to logging on a large scale.

Helicopter logging, in its infancy, is still too expensive to use in other than special circumstances today. Virgin hardwoods on steep mountain slopes and cypress deep in coastal swamps are its bidding today, and it's unlikely that we will ever see a lot of it here unless the cost decreases. Interestingly, larger ships that may enable it to do just that are on the drawing boards.

The loggers who spent years using oxen and crosscut saws to harvest the timber from the headwaters of Armstrong Creek some 100 years ago would be amazed at the speed and efficiency of the machinery used there this spring. Could it be that we would be equally amazed at the machinery used when these tracts come up for harvest again in another hundred years? Looking at the progress that has been made in logging equipment and techniques in just the past 20 years, I suspect we would.

Buy A Print

Save Cape Hatteras Light

Written and Edited by Mark Taylor

The Cape Hatteras light is a treasured sight to most Tar Heels, and the N.C. Wildlife Federation would like to help save this historic landmark. Consequently, the Federation is offering a series of limited-edition prints of the light, and $5 from the sale of each print will be donated to the Save the Lighthouse Fund. The print was done by Jake Taylor, a well-known artist from Raleigh, who also painted the Wildlife Federation's 1982 print of the year which featured Canada geese at Ocracoke. The categories and prices of the lighthouse print (including delivery) are as follows:

— Unsigned and unnumbered prints are $30;

— Signed and numbered prints are $40;

— Signed, numbered and remarqued prints are $50.

To order these prints, send a check or money order to the N.C. Wildlife Federation, Lighthouse Print, P.O. Box 10626, Raleigh, N.C. 27605.

A Tar Heel Treasure: *Limited-edition prints of the endangered Cape Hatteras lighthouse are being sold by the North Carolina Wildlife Federation, and a portion from the sale of each print is being donated to the Save The Lighthouse Fund. For more information, contact the N.C. Wildlife Federation, Lighthouse Print, P.O. Box 10626, Raleigh, N.C. 27605.*

Hopping Dilemma

Are Coastal Sandpipers Missing Legs?

Dear Sirs

I take and very much enjoy *Wildlife In North Carolina* magazine. Many thanks for a lovely journal.

I am writing to ask if you are aware of a problem which we noticed last spring. We were staying at Atlantic City, just south of Morehead City. While we were walking up the beach, we noticed that numerous sandpipers had only one leg. At first we thought they were standing on one leg with the other tucked up under their bodies, but it soon became clear that the legs were actually missing. Several birds were having trouble with their balance, and couldn't run through the surf with the rest of the flock. Members of both the larger size sandpipers and the smaller ones (two species) were involved. At one time we were looking at a flock of perhaps 40 birds, and five were missing a leg. As I said, some were having difficulty with balance while hopping and others were quite agile.

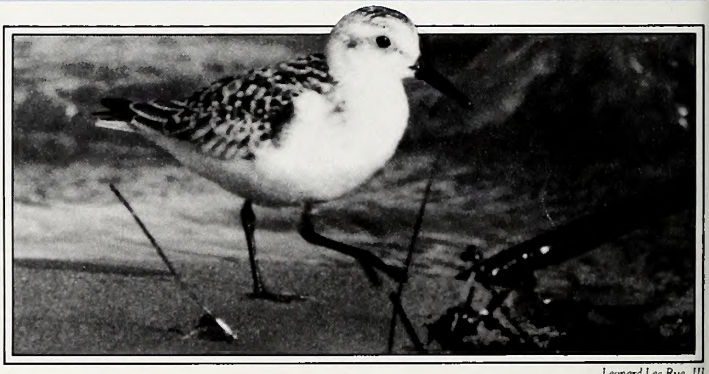
I hope that someone can take a look at the birds on our shore, and look into this matter. I would be very interested in the results.

— Laura T. Gutman, M.D.
Durham, NC

We spoke to Dr. James Parnell, an ornithologist at the University of North Carolina at Wilmington, about this matter.

He replied that it is very rare for sandpipers to lose legs but they hop about on one leg all the time. This is especially common in the winter. No one really knows why, but the best educated guess is that this is an adaptation made to conserve body heat. He says that the birds are very reluctant to lower the leg that is tucked up against the body and will tolerate the loss of balance and agility that you mention.

Dr. Parnell adds that sandpipers and other birds occasionally lose a foot or a leg to frostbite, the bite of a fish, and other natural accidents. These are rare occurrences, though, while hopping about on one leg is standard winter behavior.



Leonard Lee Rue, III

Whole and Kicking: *Sandpipers often hop about on one leg to conserve energy, especially in the winter. This often gives the illusion that they have lost a leg.*

Reader Was There

Hard Lessons Learned In Everglades Deer Rescue

Dear Mr. Taylor

A copy of your article, "A Battle With No Winners," concerning the Everglades deer hunt/rescue, was forwarded to me by a friend in the animal-rights movement. As one who was present on the first day of the hunt and took part in the rescue, I would like to share some of my experiences with your readers.

To begin with, I participated not because I was convinced of the ecological propriety of the action — the situation arising from and correctable only in terms of water-management policies and the larger issues of human overpopulation and overconsumption — but primarily to gain some experience in animal rescue. I also wanted to take a stand in favor of alternate solutions to the old "kill 'em for their own good" line, which should not be our only recourse in correcting the biological imbalances we produce. Before and during the hunt I spoke to a variety of hunters, from Johnny Jones of the Florida Wildlife Federation to members of the Florida Halftrack Club; some were openly hostile, shocked that anyone would presume to protect man's God-given right to hunt, and some understood the underlying ecological issues involved. We got to air our grievances and clear up some misconceptions.

The hunters were admitted into the area south of Alligator Alley at dawn. The rescuers were sent into the north section, where the flooding was more severe, at a little before noon, hardly an auspicious beginning on either count. I must admit that the rescue attempt did not seem particularly well organized. The several officially designated leaders of the rescue were rather verbose in instructing us to return on time and not get hurt, but really quite vague about exactly how to achieve the capture and transport of frightened, struggling animals. The Florida Fish and Game Commission likewise contributed little more than a military presence. The rescuers themselves were a motley crew, most of the airboats as far as I could tell being volunteered and operated by hunters.

We were in the second party of five airboats to depart. It took about an hour of sliding over the sawgrass to find a deer and about five minutes to tackle it, bind its legs, and get it back into the boat. By far the most difficult part was trying to keep the deer from injuring itself during the long ride back in. Our catch was a fair-sized doe, alert, active, and well-fleshed out.

No tranquilizers were administered, but each arriving deer was given a shot of cortisone, supposedly as protection against the stress of capture. It was not until I discussed the situation with some University of Florida veterinarians upon my return home that I became aware of the "capture myopathy" syndrome, a frequently fatal condition of muscular degeneration brought on by sustained pursuit, the stress of being caught, certain chemical-immobilization agents, and perhaps a variety of other as yet poorly understood factors that come into play when humans attempt to capture and transport wild animals, particularly hoofed mammals.

While early reports were that all but one of the rescued deer were doing well, I was saddened to learn that only six survived in the long run. I still feel that animal rescue may be an appropriate course of action in certain situations, but it clearly has its drawbacks, and further attempts must be moderated by the knowledge that any human intervention, no matter how well motivated, may take its toll.

So perhaps we all learned something last summer in the Everglades. Some learned that the public is no longer content to accept killing as the only answer to problems of wildlife management. Others learned where some of our ecologically unwise land and water-use policies are taking us. Some animal-rights activists learned that not all hunters are ignorant rednecks with a lust for killing, and possibly some hunters learned that not all hunts need end in a kill. The biggest lesson to be learned, however, is one for our sprawling society at large: we cannot go on forever changing the face of the earth in continual pursuit of the human advantage at the expense of all other living things. Animal activists know that the biggest threat to wildlife in Florida is not the hunter but the bulldozer — and we welcome all who have the courage to stand beside us in the path of that advancing mechanical beast.

— Ronnie Hawkins
Archer, FL

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the Sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions.

Status On June 30, 1983

	Numbers Sold	Revenue Received
Lifetime Sportsman's License	4492	$1,290,803.62
Lifetime Hunting License	50	8,650.00
Lifetime Fishing License	204	33,064.72
Life Subscriptions to Wildlife In N.C.	169	18,413.31
Contributions	—	26,283.35
		Fund Total: $1,377,215.00

Gets 30 Years

Killer Of Conservation Officers Sentenced

Claude Lafayette Dallas — the self-styled "mountain man" who killed two conservation officers in Idaho — is now in prison. Last fall, a district court in Caldwell, Idaho, found Dallas guilty of three charges of voluntary manslaughter. Dallas was sentenced to serve 10 years in prison for each count, with the sentences running consecutively. He will be eligible for parole in 10 years.

The killings occurred in 1981 in the Owhyee Mountains of southeastern Idaho, when Dallas was confronted in his camp by Idaho Conservation Officers Bill Pogue and Conley Elms. Local ranchers had reported widespread poaching and illegal trapping, and Dallas was the prime suspect. The officers removed a handgun from Dallas, who had a second gun hidden. He shot and killed both officers, and disposed of one body in the desert and dumped the other in the Owhyee River. His partner later reported the matter to police, and was cleared of all wrong-doing.

The killings sparked a 15-month national manhunt for Dallas, which included portions of western North Carolina. Eventually, Dallas — who had boasted that he'd "never be taken alive" — was found living in a trailer in Paradise Valley, Nevada. After bolting across the desert in a pickup truck — while engaging in a running gun battle with 15 to 20 officers from the FBI and local police and sheriff's departments — he surrendered after being shot in the foot. Dallas was also being shadowed by a helicopter and small plane.

The jury dropped the original charges of two counts of first degree murder, three counts of using firearms in a felony, carrying a concealed weapon, and resisting arrest because they felt that Dallas had only been defending himself.

"We just figure that Pogue (one of the conservation officers) drew his gun, and Dallas was a better marksman — that he was put in a position of self-defense," the jury foreman later told the Idaho Statesman. "Dallas was a faster draw — he won out."

Another juror, commenting on the verdict, said that "we just thought that the wardens were overbearing."

The Idaho Fish and Game Department, however, was not pleased at the verdict.

"This verdict will have a profound and lasting impact on the morale of conservation officers and all department employees," said Jerry M. Conley, director of the agency. "It is a verdict that has cheapened and jeopardized the lives of peace officers everywhere."

Try These Recipes

Snapping Turtles Are Tasty Fare

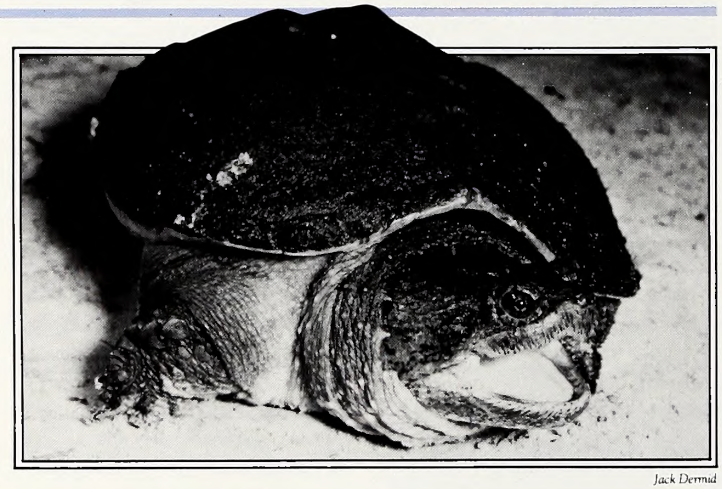
Snapping turtles may do much of their future swimming in gravy judging from the inquiries we received from readers following last month's article on catching turtles. For those who would like to partake of this delicacy, here are two recipes for cooking snapping turtles.

This highly touted recipe comes from James Maske of Stanley County:

COOTER STEW

5 lbs. turtle meat
1 lb. pork chops
1 lb. stew meat or venison
2-3 lbs. chicken
1 lb. onions
3 large cans tomato juice
1/2 gallon milk
2 tablespoons ground red pepper
1 small bottle A-1 steak sauce
salt and pepper to taste

Cook all of the meats together until done. Pick the meat off the bones. Combine the meat with all of the other ingredients and simmer for a minimum of two hours before serving. This recipe yields approximately four gallons of "cooter stew," and is said to be highly addictive. If there is any left over, it freezes well for future use.



Jack Dermid

An Unlikely Delicacy: *Snapping turtles make excellent table fare, and "cooter stew" has been a popular southern dish since colonial times when large snapping turtles were raised in swill bins at taverns before being slaughtered for the table.*

A similar recipe comes from John Foil of Mt. Pleasant, and is basically a recipe for turtle soup.

TURTLE SOUP

turtle meat — precooked and deboned
chicken meat — same
chicken stock left over from cooking the chicken
milk
butter
onions
potatoes
salt and pepper

Add all of the ingredients together, and simmer until the onions and potatoes are done. You'll notice that John gives no specific amounts for each ingredient. His explanation is simple: "experiment until you find the combination that suits your taste buds best."

— Terry Shankle

Hints For Flavor

Care Of Catch Is Key To Tasty Fish

I didn't like the first bass I ever ate, nor the first crappie or bluegill for that matter. When it came to fish, my tastes leaned heavily in favor of the flounder, spots, croaker, sea trout and other saltwater fish that were easily obtained near my coastal Carolina home. At the tender age when I was developing those tastes, it never occurred to me that the differences in salt and freshwater fish were only partially due to the species and waters from which they were caught. Equally important was how they were cared for after they were landed. The saltwater fish I was so fond of were, for the most part, caught by commerical fishermen and iced down as soon as they came onto the boat. The bass, bluegills and crappie my fishing buddies and I caught weren't always so well cared for.

I have since learned that care of the fish you catch — from the moment it comes over the gunnels to when it's cooked — is of the utmost importance if the fish is to be at peak freshness and flavor when it reaches the table. Since learning this important lesson, my esteem for bass, bluegills and crappie — as well as a wide variety of other fresh and saltwater fish — has risen immeasurably.

Most sweetwater anglers use stringers to store fish while they are fishing. Stringers are fine in the spring and fall when the water is cool, but in mid-summer the surface temperature of many lakes and ponds is often in the 80s. Fish caught from deeper, cooler water often die when held on stringers in the warm water at the surface, and at this temperature decomposition begins almost immediately. Fish on a stringer may also pick up traces of oil and gas slicks from outboard motors.

If you don't use a stringer to store your fish, what is a better option? A live well or holding tank isn't much of an improvement if the same warm, and perhaps oily, water is used. However, filling a live well with fresh tap water and throwing in a large chunk of ice is a better option. Operating the aerator periodically in the ice-cooled water will keep the oxygen level up to snuff, and your fish should stay alive and fresh.

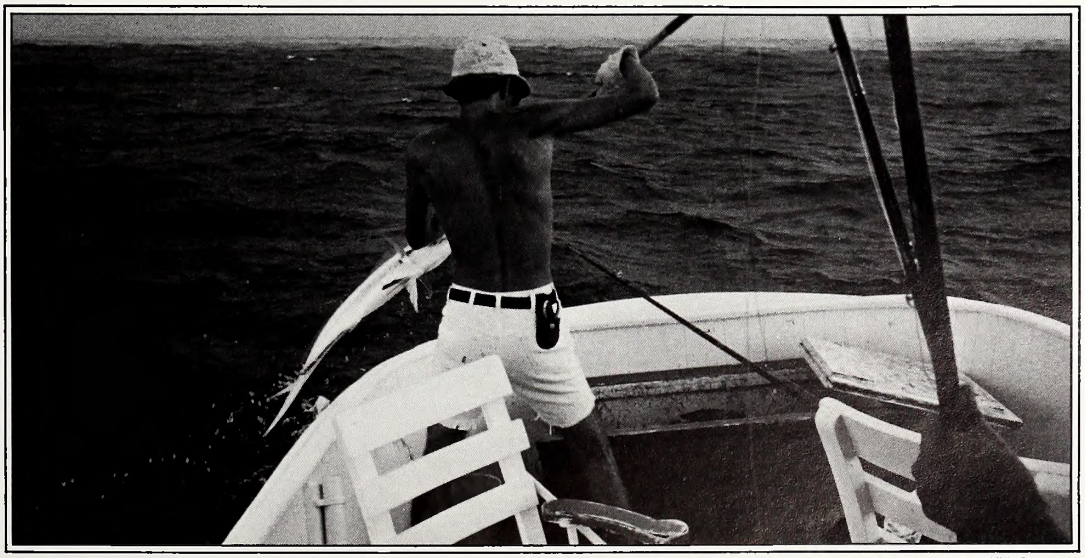
A better method is to simply ice down your catch — commercial fishermen have known this for years. If you have access to a cooler, simply fill it with ice and drain the melt-water occasionally. Also, keep a supply of plastic bags on hand (zip-lock bags work well, but those with ties are also good). When a fish is caught, place it in the plastic bag and bury it in ice. Placing the fish in the bag prevents the cooler from becoming covered with slime, and guards the fish from the melt water. The flesh of fish which is allowed to soak in melt water quickly loses its texture and becomes blah and tasteless, so it's important to keep the cooler drained or the fish enclosed in plastic.

Care of the fish when it comes aboard, and before it is iced down, can also make a difference. Many anglers feel that it is best to kill and gut the catch immediately. Simply give the fish a sharp rap on the back of the head, and with a sharp fillet knife gut the fish before icing it down — any entrails dropped overboard will quickly be eaten by catfish and other scavengers. Here again, it's worth noting that many commercial fishermen gut, clean and ice their catch as soon as possible — assuring that they will get the top price for their catch at the dock.

Once you've gotten the fish home, the fun begins. Here's a recipe for bass that we think you'll enjoy.

CHEESY BASS FILLETS
1 lb. bass fillets
3 tablespoons mayonnaise
1 teaspoon prepared mustard
2 teaspoons lemon juice
1/4 teaspoon chervil
1 tablespoon grated Parmesan cheese
1 tablespoon bread crumbs
parsley sprigs
lemon wedges

Mix mayonnaise, mustard, lemon juice and chervil together and spread over the fish fillets. Place the fillets on buttered aluminum foil. Sprinkle with cheese and bread crumbs. Broil 4 inches from heat for six to 10 minutes, until the flesh flakes. Thin fillets will take six minutes, thicker fillets up to 10 minutes. Serve with parsley sprigs and lemon wedges. Serves four. — *Curtis Wooten*



N.C. Wildlife Commission

The Time To Start: *The key to serving tasty fish is to take good care of the catch. It's best to clean fish immediately after they are caught, and then preserve them in an ice and brine mix.*

North Carolina Calendar of Events

August 4-6
37th Antiques Fair at the Asheville Civic Center.

August 4-6
56th annual Mountain Dance and Folk Festival at the Asheville Civic Center.

August 6-7
Craft Fair and Battle reenactment at the House in the Horseshoe State Historic Site in Sanford.

August 13
Shrimp Festival at Sneads Ferry.

August 18
Strange Seafood Exhibition at the Hampton Mariners Museum in Beaufort. Over 40 strange seafoods will be available for sampling. For more information, contact the Hampton Mariners Museum, Programs Coordinator, 120 Turner St., Beaufort, N.C. 28516.

August 20
6th annual Byard Ray Folk Festival at the Brevard Music Center. Features traditional mountain folk dancing and music.

August 20-21
Gun Show at the State Fairgrounds in Raleigh.

August 21
Carolina Sailing Club Race at Kerr Lake. For more information, contact Kent Mulliken, 101 Windsor Place, Chapel Hill, N.C. 27514.

August 22-27
Burke County Fair in Morganton. Arts, crafts, livestock and agricultural exhibits featured.

August 23 — September 5
North Carolina Apple Festival in Hendersonville.

August 28
Herb Tasting Party at the Duke Homestead State Historic Site in Durham. Features foods and beverages containing herbs grown in the homesite's gardens.

Only $5

1983-84 North Carolina Wildlife Calendar

Six nationally known wildlife artists have contributed fine outdoor and wildlife paintings to the 1983-84 calendar. Their paintings are in museums and private collections throughout the country, and you've seen examples of some of their work in WILDLIFE IN NORTH CAROLINA magazine. This calendar is almost certain to become a valuable collector's item with such artists featured as:

- Bob Binks
- Bob Dance
- Cecil Eakins
- Larry Barton
- Duane Raver
- Lee LeBlanc

Calendars are $5 each; however, if you purchase 50 or more, we will sell them to you for only $4 each.

This is a project of the Chairman's Wildlife Advisory Committee, a group of North Carolina conservation leaders who have been appointed by the Chairman of the Wildlife Resources Commission to provide information, guidance and support for the agency's wildlife conservation programs. Proceeds from the calendar will go for these purposes.

Yes, please send me _____ copies of the North Carolina Wildlife Calendar. I have enclosed cash, check or money order for _____. We do not bill.

Name _____

Street _____

City _____ State _____ Zip _____

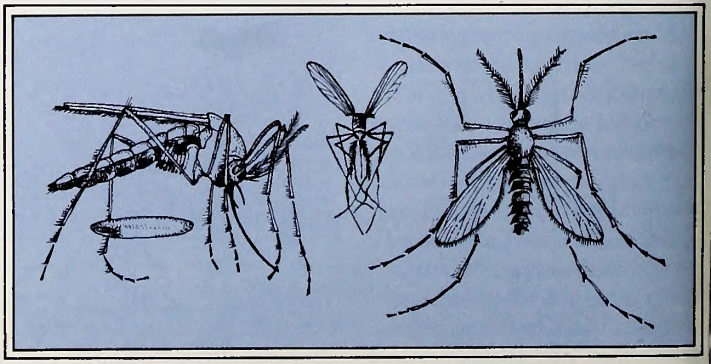
Phone Number (including area code) _____

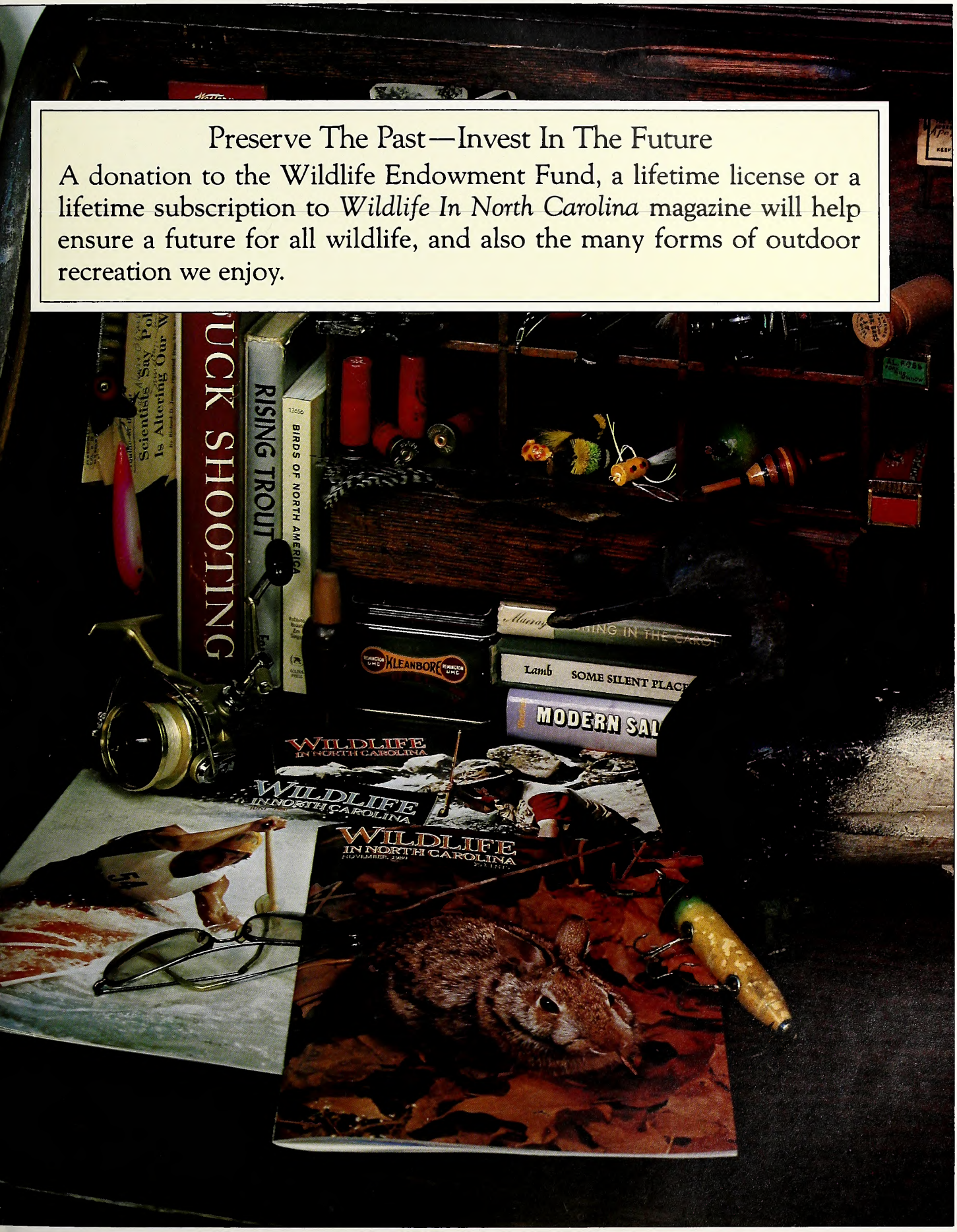
Return form and payment to Chairman's Wildlife Advisory Committee, care of George Mason, P.O. Box 473, Dallas, N.C. 28034 or give the form to a member of the committee. Checks should be made out to the Chairman's Wildlife Advisory Committee.

Try DEET Better Than Bear Grease

First there was bear grease. Then came oil of citronella and smelly pipes. Now there's "DEET," and that's what you should look for when you buy insect repellent. DEET stands for N, N-diethyl-meta toluamide — the tongue-twisting chemical compound that puts the punch in bug stray.

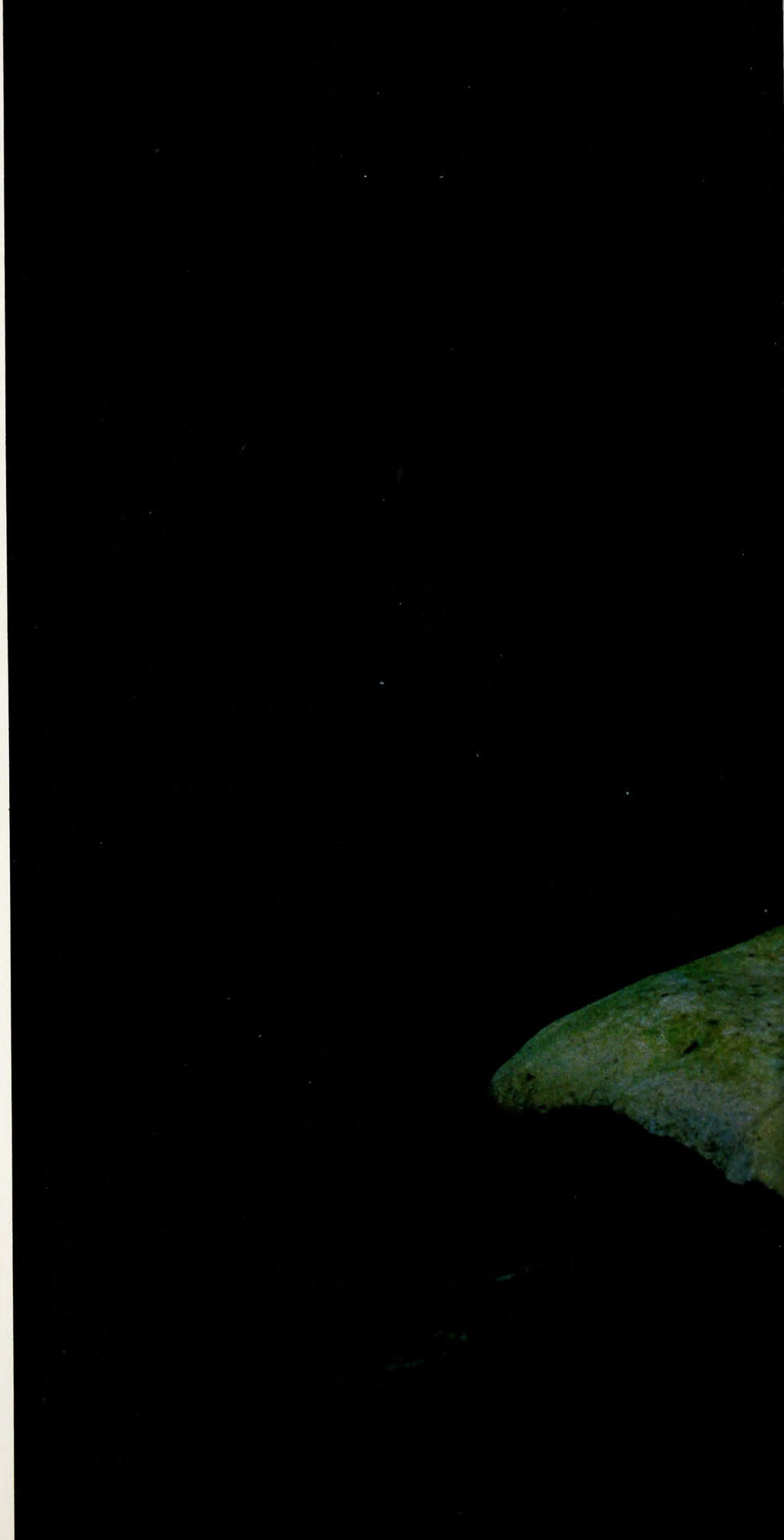
The active ingredient in most modern insect repellents is DEET, and the percentage used is listed on the package. Consequently, picking the cheapest repellent may not be the best buy — it pays to shop around. In fact, some repellents have been introduced to the market that are 100 percent DEET, and parent companies claim that these super bug sprays will repel mosquitoes, gnats and other nasties for up to 10 hours. It's worth a try — there's always bear grease to fall back on.





Preserve The Past—Invest In The Future

A donation to the Wildlife Endowment Fund, a lifetime license or a lifetime subscription to *Wildlife In North Carolina* magazine will help ensure a future for all wildlife, and also the many forms of outdoor recreation we enjoy.



Dinner Is Served

Claws notwithstanding, this crayfish is only a gulp away from supper for this bass.

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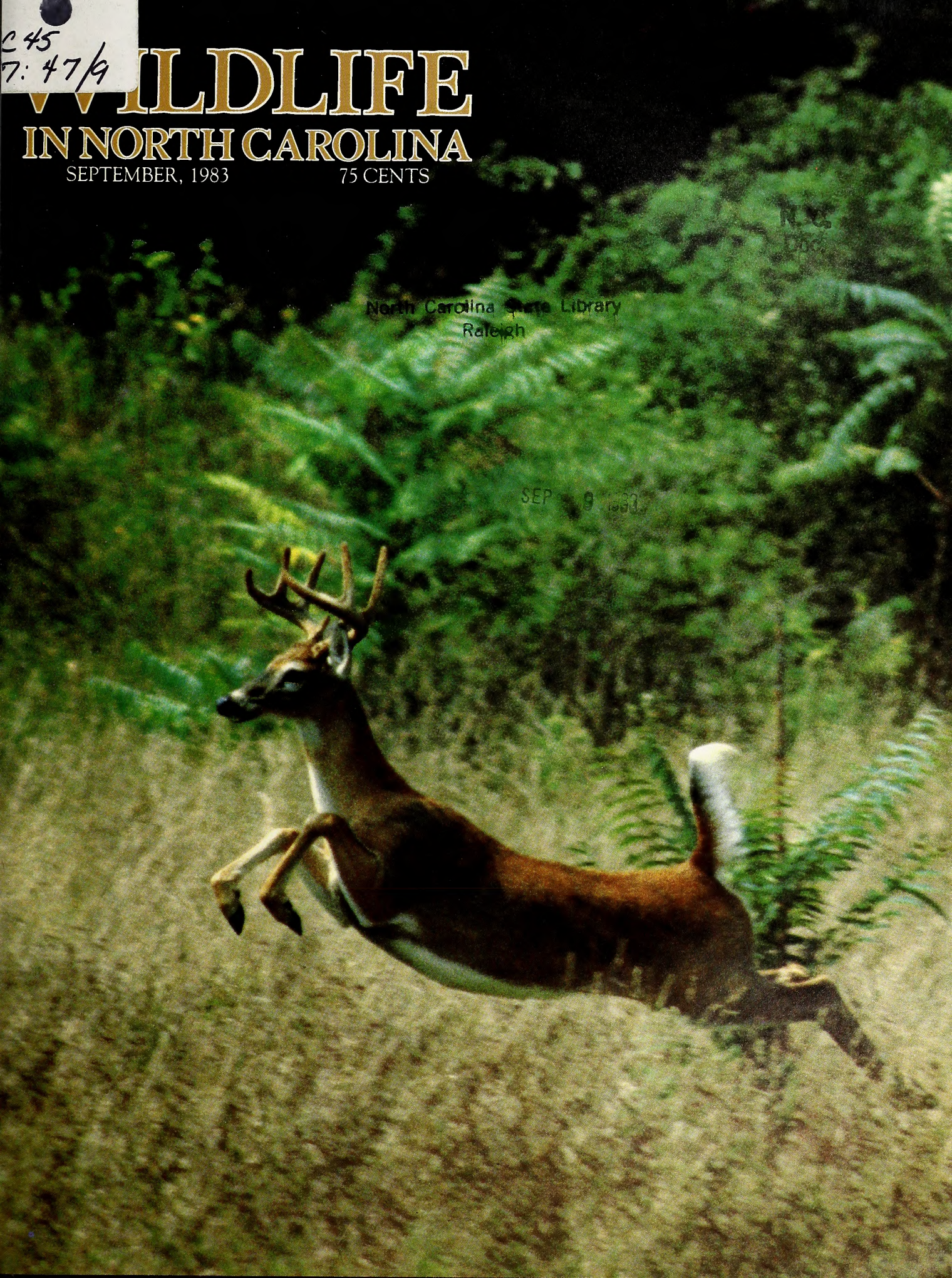

To Catch A Comb

by Jim Dean

For many years, Ed Zern in his "Exit Laughing" column has regaled the readers of *Field & Stream* with the adventures of the Madison Avenue Rod, Gun, Bloody Mary & Labrador Retriever Benevolent Association (MARGBM&LRBA). It was from Zern and his cohorts that we learned how Edwin Hubble's discovery that the universe is expanding might explain numerous missed shots at doves, quail and other swift-flying creatures. Hubble, you will surely recall, observed that the universe expands at an uneven rate, and Zern theorized that it was therefore not unlikely that an unexpected cosmic lurch might affect the carefully calculated lead on a passing shot at a widgeon.

That has proven to be a useful concept to countless gunners, myself included. Yet however grateful we are, there is a suspicion that Zern and his group of cronies never really escaped the Big Apple long enough to test this theory.

Indeed, Ed, out here in the hinterlands, some suspect that your association does not altogether exist. Even if it does and meetings are held, they must surely deal with matters cerebral rather than actual. One can hardly imagine the association going outdoors, for Heaven's sake, except perhaps to walk a poodle or pick up a copy of the *New York Times*. In North Carolina, and presumably elsewhere, there are groups not unlike yours, except that their experiences almost always take place outside! This understandably gives one a different perspective. Of course, you probably already know this from your other role as fishing editor, but by all means encourage your members to venture beyond the last poodle spoor.

Anyway, Ed, you may be pleased (though possibly not) to hear that I thought of you at the latest gathering of the Possum Trot, Cane Pole, Bluegrass, Steam Whiskey and Ace High Straight Appreciation Society (PTCPBSWAHSAS for short). On a recent field trip, one of the members of this society made a remarkable discovery; to wit, that it is entirely possible to catch fish that have already been cleaned. We feel this may rank alongside the MARGBM&LRBA discovery of the expanding universe.

Members of our group were casting bait into the surf at Emerald Isle, catching an occasional skate or dogfish. From time to time we would take a sip of the finest malt, barley and hops in order to keep from becoming dehydrated in the late summer heat. This carefully achieved equilibrium of copious body fluids and meager fish suited all of us except a member I will call Alan. Being a practical man, he has a natural disdain for using fresh, deliciously edible (not to mention expensive), shrimp for bait when all he can catch on it is something ugly and virtually inedible. It strikes him as a poor business arrangement.

"If I could bait up with dogfish and catch a mess of shrimp, now that would make some sense," he complained. His solution was to switch to a Hopkins Lure. Dogfish don't eat artificial lures, but as you know such tasty fish as blues and flounder sometimes will.

Illustration by David Williams

Launching a cast into the sea, he began to reel. Hardly had he turned the handle when he had a strike, which he loudly announced so that all in hearing could share in his success. After a spirited battle, he landed a nice flounder that would have weighed about 2 pounds had it not already been neatly filleted. The treble hooks were caught on the bony remains, and it looked for all the world as though he had caught a very large comb. Alan seemed puzzled.

"Look here, fellow, this could be a good thing," we encouraged after we had caught our breath and brushed off the sand. "If you could figure out how to catch the fillets rather than the bones, personkind would forever be indebted to you."

Chastened, Brer Alan, he lay low. But by'm by, he summoned the courage to try again. Once more he cast into the waves, and this time he brought forth a sea mullet — or what had been a sea mullet before the fillets had been removed.

Little of consequence happened the remainder of the afternoon but as we left the beach, I noticed that fishermen were cleaning flounders and sea mullet on the pier that stood a 100 yards upcurrent of where we had been fishing. As they filleted a fish, they dropped the remains overboard.

I was about to poke Alan on the arm to point out this curiosity when the universe gave a sudden lurch and by the time I had righted myself, the urge had passed. Just as well. Why ruin it for him? His eyes were glazed with the fervor of a man who was onto something.

See what happens when you get out of the city, Ed? There should be a wagon train headed down this way sometime this month. You and your friends won't need to bring a thing. We've got the cards, a jug and an 8-track of Ralph and Carter Stanley singing some good stuff. Oh yeah, Alan hasn't found a way to catch fillets yet, but you might want to give it a try. We can put you in just the right spot.

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

CONTENTS

4 **Bow For a Buck** *by Ed Jenkins*
Sometimes the best you can do is not enough.

8 **Picking The Right Gear** *by Warren Parrish*
Before you buy that first bow or a dozen expensive arrows, consider these tips from an experienced archer.

10 **Gigging And Swatting** *by Curtis Wooten*
Gigging flounders at night is an old tradition along the coast. So is swatting mosquitoes.

15 **Hunting Season Roundup, 1983-84**
Here's a quick look at the upcoming hunting and trapping seasons. For more complete information, consult the 1983-84 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest.

19 **Heating With Wood** *by Terry Shankle*
Even if you already heat with wood, you'll find these tips useful, and our wildlife neighbors will appreciate it if you follow them.

24 **An Uncommon Bird** *by Carl W. Betsill*
Abundant and appreciated by all, the common mourning dove has some uncommon qualities.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

Back Of The Book *by Mark Taylor*

Cover *Photographer Ken Taylor, captured this handsome white-tailed buck in graceful mid-leap.*

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How Long Do They Live?

written by Lawrence S. Earley / illustrated by David Williams

How long do animals live?

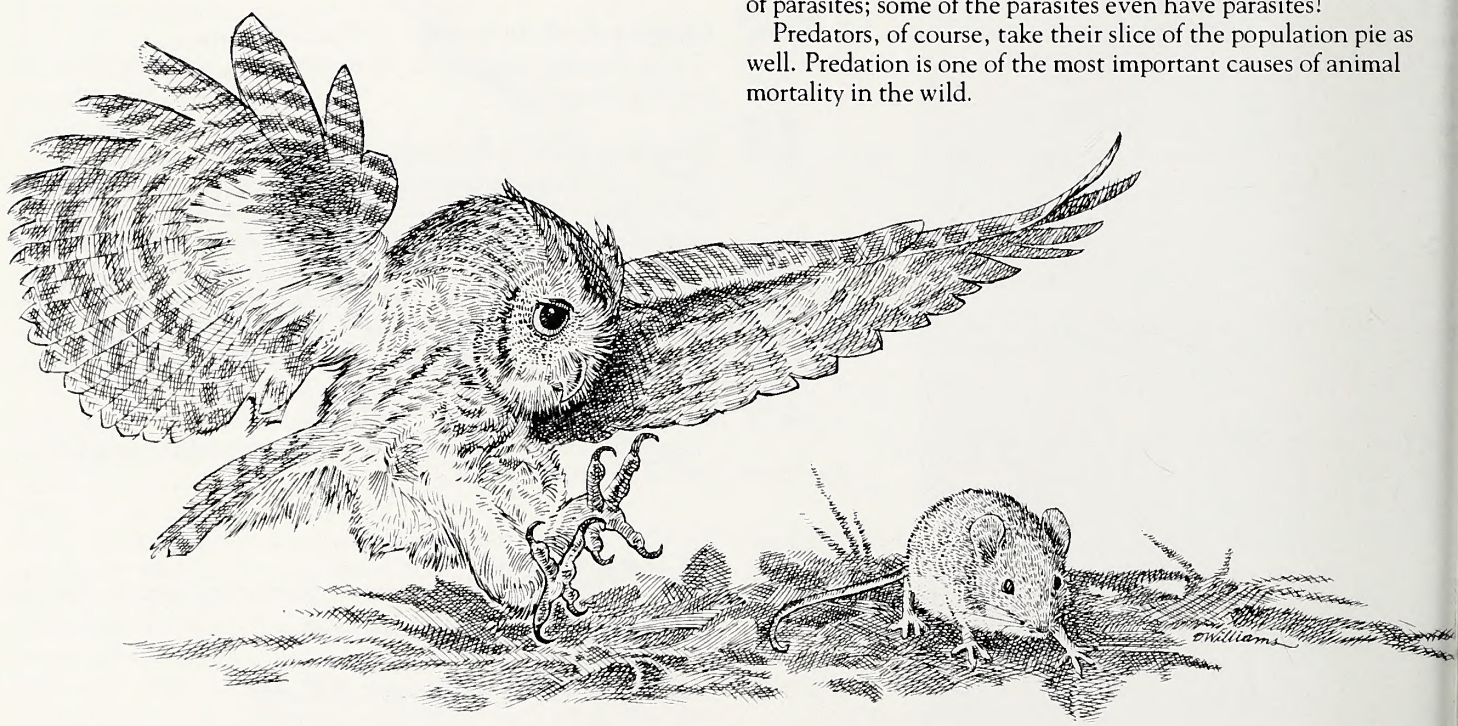
Not very long, as the chart shows. A captive deer, pampered and protected, may live for 18 years or so before its biological clock runs down. A laboratory mouse may reach a hoary four years; a captive quail, 30 years.

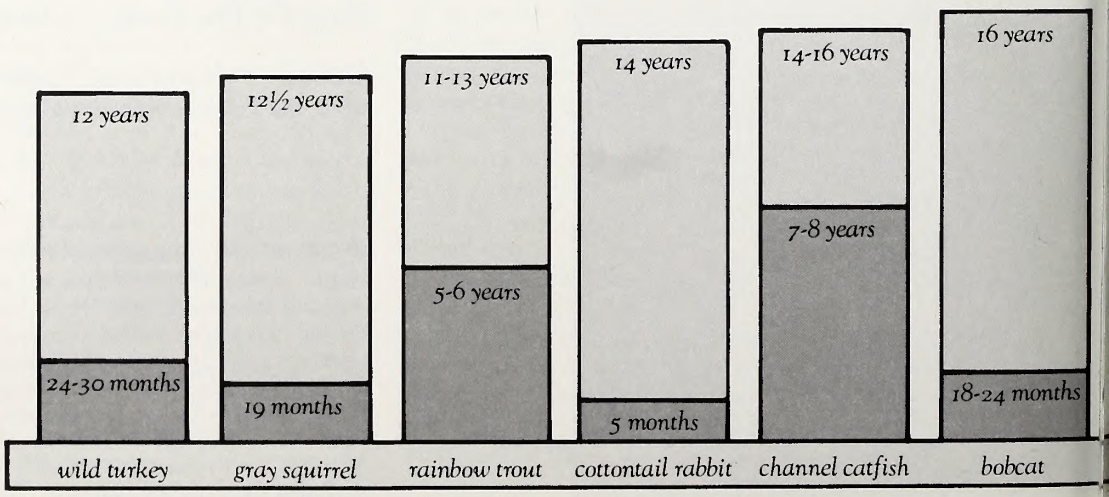
But in the wild it's the rare animal that survives to a patriarchal old age. Animals generally die young, well before the time allotted them by their biological clocks. In the woods most deer are dead before their third birthday, and 50 percent of the year's new quail population are dead by the time they are 15 weeks old. A couple of months is about all a wild mouse can count on.

Animals in the wild die young because they are subject to natural controls that are missing in captivity. Weather is a good example. Ice, snow, heat, drought, floods — severe weather conditions of all kinds cause heavy losses in wildlife populations. Sometimes this occurs directly, as when a spring flood drives muskrats out of their lodges and burrows, drowning many of their young. Or sometimes it works indirectly, when a cold spring kills oak blossoms, slashing the acorn crop in the fall and causing starvation in squirrels.

Disease is another cause of mortality in wildlife populations. Because so many of the world's most virulent diseases have either been eradicated or are under control, humans tend to think that good health is the natural state and ill-health a departure from the norm. But in the natural world disease is common — disease from viruses, bacteria and fungi, and disease passed by parasites. "Health," writes ecologist Marston Bates, "in the sense of freedom from parasitism, is unusual for an individual or for a species." Just about every animal in the woods is host to a number of parasites; some of the parasites even have parasites!

Predators, of course, take their slice of the population pie as well. Predation is one of the most important causes of animal mortality in the wild.





Few animals reach old age in the wild. It's likely that the field mouse was just a few months old when the screech owl caught it. In a zoo, on the other hand, the field mouse might have lived almost four years. Predators, disease, lack of food and severe weather are forces that shorten a wild animal's life and keep wildlife populations in balance with their environment.

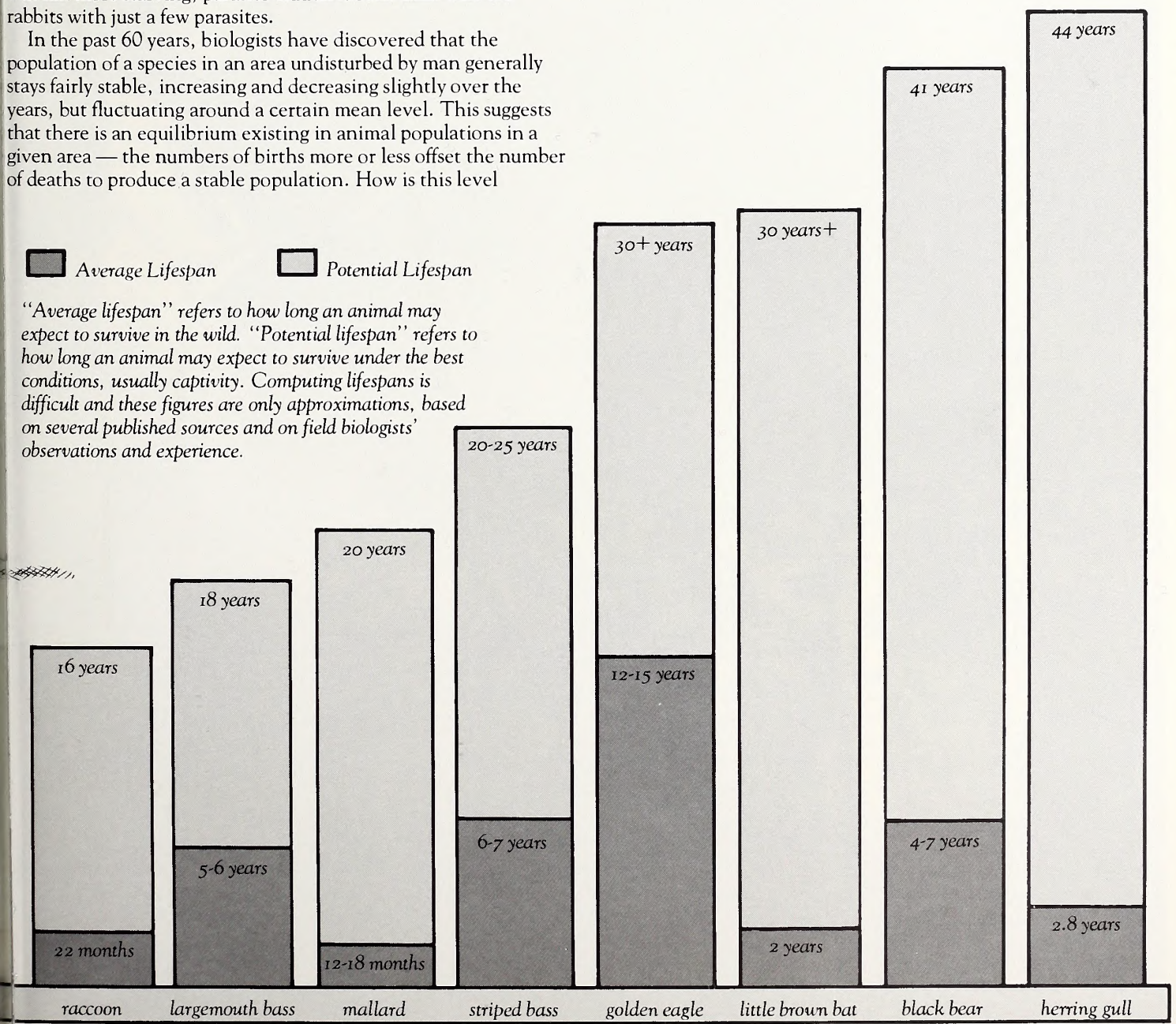
These and other influences join to reduce wildlife populations. How effective they will be depends to a great extent on the density of a population. Put another way, the chances of a deer reaching its second birthday are greater if there are relatively few deer in the area than if the area is overrun by them. As the population grows, more animals will die of weather-related causes, disease, starvation and predation.

For example, as the rabbit population in an area increases, food will gradually become scarcer and rabbits may die of starvation. Foxes, drawn to the plentiful food supply, will feast on rabbits until the population thins out and then they will turn to chipmunks and other species. Parasites will find it easier to move from rabbit to rabbit because of the great numbers, and more rabbits will die of disease. Even the effects of weather may depend on the density of the population. It's likely that a severe winter will kill more starving, parasite-ridden rabbits than well-fed rabbits with just a few parasites.

In the past 60 years, biologists have discovered that the population of a species in an area undisturbed by man generally stays fairly stable, increasing and decreasing slightly over the years, but fluctuating around a certain mean level. This suggests that there is an equilibrium existing in animal populations in a given area — the numbers of births more or less offset the number of deaths to produce a stable population. How is this level determined and maintained? This is one of the intriguing problems confronting wildlife ecologists.

As the weather cools, it may be worth our time to reflect on the blessings we enjoy and the price we pay for withdrawing from nature as much as we have done. Alone among the species, man has fought to eliminate disease, famine, war and other causes of a tragically shortened life in order to enjoy his and her three score years and ten. We've not done so well at controlling our population growth and as a result our proliferating numbers threaten us today.

But bound by the iron chains of nature, other animals die well before their biological clock runs down, thus ensuring enough food and space for their own kind.



Ken Tarl

Bow For A BUCK

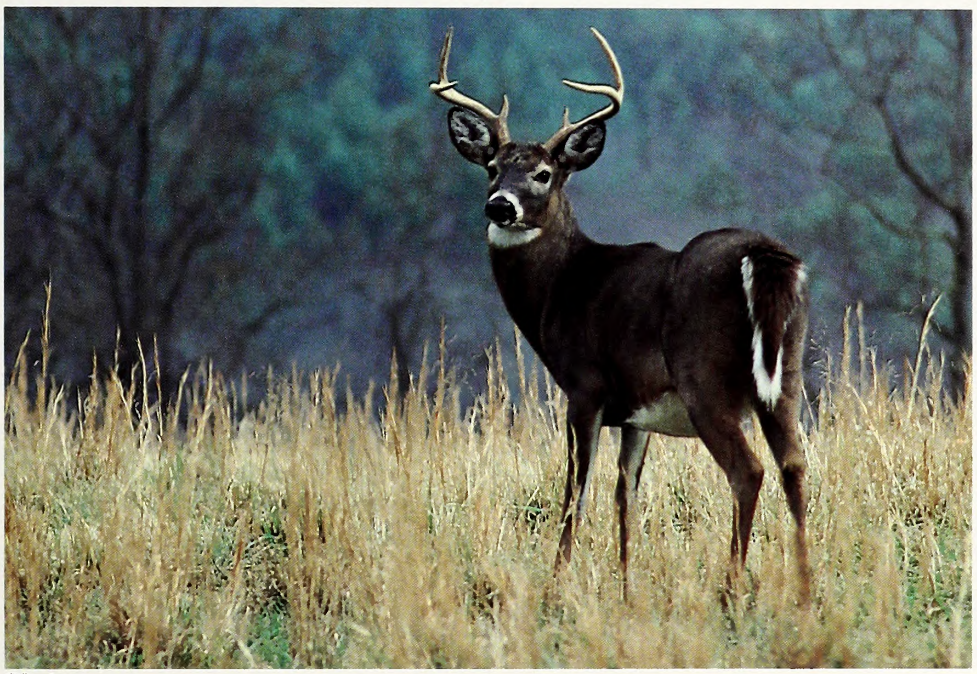
Sometimes the best you can do is not enough.

by Ed Jenkins

A drop of perspiration takes a faltering journey through the camouflage smeared on my forehead, bypasses the eyebrow and runs into the corner of my eye. The almost irresistable reflex to wipe the burning, squinting eye is overruled by an order from the brain — "Don't rub it; don't move."

Again, I search the blurred green surroundings below to see if the deer has moved, and I spot his large black eye, I quickly make out his right antler, ear, and part of his head against the background of honeysuckle vines and feel relieved that he hasn't spooked. Suddenly the buck drops his head and looks at the spotted fawn below my tree. I am afraid even to allow my eyes to focus on the buck fearing that he may be able to detect my stare. As he turns his head momentarily to investigate another object in the woods, my eyes quickly scan the area and recognize a tree that I had earlier estimated to be 30 yards from my stand. The buck is about 10 yards past that tree. In front of the deer and slightly closer I spy an opening past two vine-covered trees. "If he'll just come on in . . ." I think as I begin a slow, frozen turn on my tree stand trying to maneuver into position to be able to raise my bow and shoot.

Trying to move and avoid detection by a deer in fairly close archery range is tough, but when another deer is directly below one's tree, it's almost impossible. But the deer are so interested in each other that they do not detect the ever-so-slow turning movement of the camouflaged figure in the tree above them.



William Lea

Proud buck stands in field with neck swollen from fall rut. Bow hunter (left) doesn't often get a clear shot like this.

"When he starts moving for the clearing, I'll draw the bow as he goes behind those vine-covered trees," I plan. I silently repeat my strategy hoping to make the action automatic should the opportunity come. The tension-filled moments are taking their toll. My mouth is dry; I try to swallow, but can't. The pounding in my chest is so hard and rapid that I fear it could give me away. I close my eyes and inwardly try to will my heart to slow down. "Calm down; control yourself," I chastise myself trying to command my body not to betray me. But the pounding continues; breathing is labored. Then suddenly it dawns on me that I'm in my stand with a deer before me and I've got my eyes closed — how stupid can I be!

I quickly open my eyes and am relieved to see the buck is looking back over his shoulder into the thicket behind him. I now can clearly see his entire neck and head and know that while he's looking away from me I can draw my bow without having the movement discovered. But I don't. A 40-yard neck shot is too long for me to attempt, and realizing that there is nothing I can do unless the deer moves closer, I am able to relax somewhat and to quickly review how the situation developed.

I've been hunting from this large red oak for the past several years. It's located about 75 yards behind a field on a ditch bank where the older trees surrounding the field meet a younger, thicker growth of a cutover. The deer usually bed down in the cutover area during the day but frequently around mid-afternoon, they will move into the more open areas of large trees in search of acorns before making their way, around sunset, to the fields to feed.

This spot had always been a good early-season stand and when I scouted the area the week before archery season came in, I noticed that some deer trails coming into the field passed within bow range of the tree. I decided to hunt from the tree on opening day and got Bill Smith, of Battleboro, a hunting club member, to help me put up the stand. Bill and I usually like to use the buddy system when placing tree stands because not only is it easier and safer, but it is also fun to show off a promising area you've located and share strategy on where and in which direction to place the stand. Since we hunt from each other's stands, it also doubles our available hunting spots and offers an alternative should one of us be unable to hunt a stand.

I placed the first screw-in step in the tree about 20 inches from ground and eight steps later, I was as high as I needed to be. After fastening the chain of my portable stand around the tree and testing it to make sure it would support me, I stepped over to my perch. I could clearly see the paths the deer had made, and as I held my arms out and aimed an imaginary bow in several directions to see if any tree limbs would interfere with the draw or shot, I directed Bill on the ground to several limbs on nearby trees that needed to be trimmed. Satisfied with the stand and the area, we made our way out of the woods, tying several strips of orange surveyor's tape on the ends of several head-high branches along the trail to make sure I wouldn't have any trouble locating the stand in the early morning dark.

I had not seen a deer from the stand that first morning of bow season, but as I made my way to the stand that afternoon, I felt good about my chances of getting a shot. I moved as slowly and quietly as I could so as not to spook any deer that might be bedded down in the area. I was trying to avoid working up a sweat. I had just showered at the clubhouse, dusted with baking soda, and put on a clean set of camouflage clothing. I knew the hotter I got, the more odor I would give off and the less likely I'd be to get close to a deer. I dragged a skunk-scented rag behind me to cover my trail.

For my money, a deer's best defense is his nose. That doesn't mean his other senses are dull. A wary whitetail can spot a hunter in a tree 100 yards away, but if the hunter does not move while the deer is looking at him, the animal usually will decide that whatever is in the tree is not a danger to him, twitch his tail sideways several times, and go about his business. But if a deer ever gets downwind of a human, forget it. His nose will pick up the scent and send him hightailing in the opposite direction.

Arriving at the base of my stand, I eased off the knapsack (mosquito repellent, rain gear, flashlight, compass, marking tape,

William Lea

Wary buck wades across stream. During the rutting season bucks take more chances and hunters may take advantage of the mating urge to collect a fine trophy like this one.

knife, buck rope, and toilet paper) and tied it and my bow to the green parachute cord I had tied to the stand the week before. I placed my snakebite-proof leggings on the backside of the tree out of tobacco-juice range, and draped the skunk-scented rag over a limb at the base of the tree. What wind there was was just right. It was coming from the woods toward the field and would be behind any deer passing near my stand.

I climbed into my stand and secured myself to the tree with a buck rope, a good idea to prevent falling with a bow quiver full of razor insert broadheads. I pulled up my hunting gear, nocked an arrow on the bowstring, and began my long wait. The first hour was quiet. In fact, except for the occasional sound of a drop of perspiration striking the wooden floor of my tree stand, the woods were spooky. Two hours passed, and time began taking its toll. Muscles ached from long periods of stillness, and it was becoming harder not to fidget.

And then I was discovered. Perhaps a lone scout on routine patrol had first spotted the sweating mass of humanity in the tree, and he got off a message to the rest of the mosquito squadron. They attacked from all directions and covered every patch of exposed skin. These were not just mosquitoes, but Roanoke River bottomland mosquitoes — "*Mosquitomus Bitem Hardus.*" I've swatted mosquitoes in some hot, dank places, including the Mekong Delta of Vietnam, and believe me, these Roanoke River bloodsuckers don't take a backseat to any of them.

Searching through my knapsack between swipes, I located my mosquito netting hood and pulled it over my head. Thwarted, the main wave flew off leaving behind a guard detail of persistent sentries to make certain I didn't try to uncover.

When I looked up, I saw the deer standing there. It must have stepped out of a thicket while I was preoccupied with the mosquitoes. It was a fawn that had already left the matriarchal society to be on its own. As he came closer, I could make out the two darker tufts or "buttons" on his head where one day antlers would grow.

The crashing of the brush coming my way signaled the other deer's arrival. "Well, you're still a mama's boy after all," I thought as I looked down at the fawn which was now directly below me. Expecting a doe to appear looking for the wayward fawn, I was caught totally unprepared when I looked up and saw the forked antler on the deer's head — a buck!

That was how the hunt had started and as I wait for the buck to come closer or move off, I am caught off guard as I realize, almost too late, that he is walking in that stiff-gaited buck walk towards the spot where I hoped to get a shot. Following the plan that I laid out and rehearsed earlier, I draw the bow as he passes behind the two vine-covered trees. As he steps into the opening, I wish he would stop and give me more time. Things are happening too fast. Am I anchoring my arrow in the right place? What's the distance? Am I aiming right? Too many factors and doubts and no time to consider them; there is only time to shoot. I see the Savora broadhead covering the top of the deer's shoulder and release my hold on the bowstring.

The "thung" sound of the bow as the arrow is released stands out in my mind. My eyes pick up the blue and yellow twirling of the arrow fletching heading towards the deer. But something is wrong. The arrow is going high; it is going to pass over the buck's back.

And then I saw why. The deer was crouched so that his white belly was almost touching the ground. The keen-eared animal had picked up the sound of the bow being shot and had reacted by squatting. As the arrow sailed harmlessly over the deer's back, he suddenly leaped almost completely around and over the path of the arrow. I watched in utter disbelief as he bounded off blowing and snorting a warning to the entire area. I couldn't believe the lightning-quick reaction of the buck, yet I had witnessed the whole thing in a kind of eerie slow motion. The woods were silent again. Even the adventurous fawn had disappeared. I looked back to where the buck had been. An arrow sticking out of the ground stood as mute evidence of what had just happened. Except for it, the whole thing could have been a dream.

I was actually relieved when darkness settled in several hours later signaling the end of the hunt. Tired and stiff with muscles and bones aching from sitting and standing almost motionlessly on a small platform 15 feet up a tree for five hours, I cautiously eased myself down the tree. I didn't want to overtax muscles I did not yet have complete confidence in. As I stepped from the woods into the field on my way back to the clubhouse, I could make out the dark fleeing shapes of deer, alarmed by my approach, bounding over rows of soybeans and headed for the safety of the woods.

Ahead of me at the clubhouse there would be the good-natured joking over the missed shot. After a hot meal and shower everyone would gather in the main room to talk, plan strategy for the next day's hunt, and share tales of past hunts. Young boys and some members' guests would listen spellbound for hours to exaggerated stories most club members now knew by heart.

Later that night in a hot, stuffy room amid the sounds of snoring men and restless boys turning and shifting on squeaky bed springs, I waited for sleep to overtake me and recalled again the details of the hunt. Against my better judgment, I knew I would probably convince myself that the buck would return the next day, and I would go back to the same area. I also knew he probably wouldn't. And somewhere in the dark, perhaps even within a few hundred yards of where I was lying, the white-tailed buck might be feeding — alive for another day and smarter because of the last one. ⊠

Picking The Right GEAR

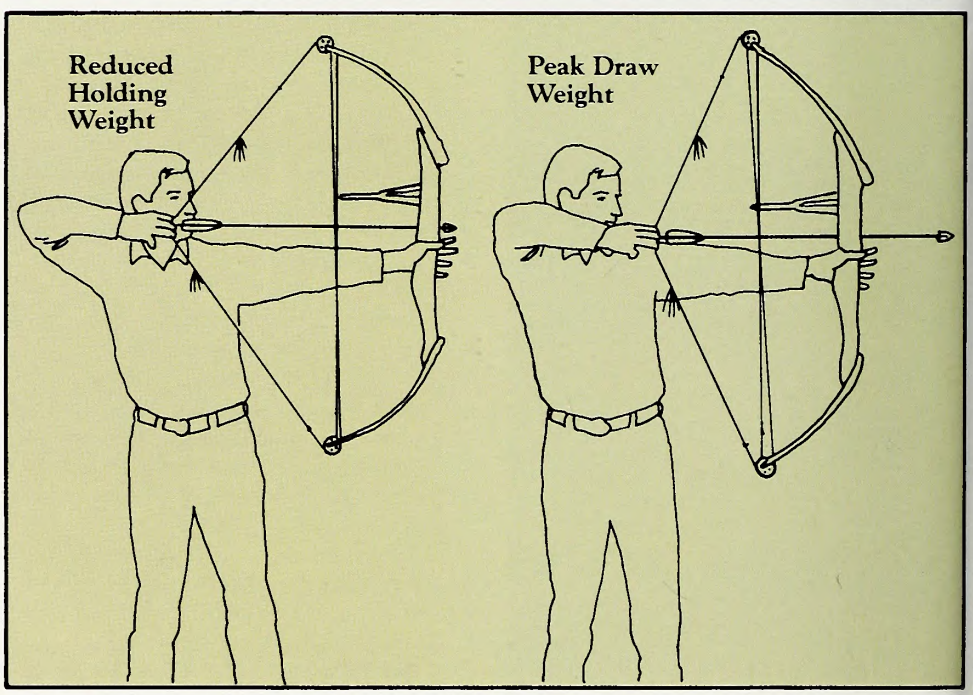
For target shooting or bow hunting, selecting the right archery equipment is best not left to chance.

by Warren Parrish

Think of the word archery, and it may conjure up visions of Robin Hood loosing a yardcloth shaft or of Indian war parties skewering a wagon train. Fortunately, today we can enjoy the more peaceful recreational aspects of archery. Chances are that most archers you meet will be bowhunters, but you don't have to hunt to enjoy archery. Tournament archery, field archery or just backyard shooting encompass activities broad enough to match any personality. There's something about an arrow's soothingly silent delivery, powered and guided by the archer, that can hook you for life.

Don't be discouraged by past experiences at camps and schools. Most of these institutions use poor quality, mismatched equipment that makes consistent shooting just about impossible.

So, what type of bow and arrow is best? How much will it cost? Actually, the type and price of equipment you need depend on the type of shooting you do. A highly specialized tournament archer may pay nearly as much for a dozen arrows as the backyard enthusiast does for a bow. The key word for the beginner is moderation. Don't buy a bow that's too difficult to draw, or pay for. A modestly priced bow and a dozen arrows can be purchased for around $100. Oddly enough, it is the arrow, not the bow, that is most critical to shooting accuracy. So, don't skimp too much on the arrows.



Draw Weights (in pounds)

	Rabbit/ Squirrel	*Fox*	*Deer/ Bear*
30-40			
40-50			
50-60			

The Bow

If it's been years since you last shot archery, you're in for a surprise, the surprise being the compound bow. Unlike the longbow or the recurve bow, the compound is easy to hold at full draw. Initially, the compound is similar to the longbow and recurve in that the bow string becomes more difficult to pull the further back you draw. This similarity lasts until approximately half draw when the compound reaches its peak or maximum weight and then eases off to a full-draw holding weight that is greatly reduced. The results are impressive. A compound with a 25-pound holding weight can cast an arrow equal to a 50-pound recurve. This has been a marvelous breakthrough. Now, an archer can shoot more easily and accurately by not having to struggle with a heavy holding weight while aiming.

The let-off capability of the compound bow is achieved through the use of two of the "six simple machines" — the lever and the pulley. When one considers the thousands of years that bows, pulleys and levers have been used, it is baffling that the compound was not invented earlier. It wasn't until 1969 that H.W. Allen patented the first compound bow.

The compound's flat shooting qualities may give the impression of producing a faster arrow with less work done by the archer. But, this is not true. The compound is easier to hold at full draw than the longbow

or recurve, but is more difficult to draw for the first several inches. The compound's limbs cannot store more energy than an archer's muscles give it. It does, however, manage this energy more to our liking by giving us a reduced holding weight.

Within the last year, modified compound bows have flooded the market. These bows incorporate cams mounted on graphite limbs. This arrangement allows the bow to store more energy by enabling the bow to reach its peak weight earlier and hold it longer before let-off occurs. When an arrow is released from a cam bow, it really moves! This latest development has brought a bow's energy-storing ability close to an impasse. There's simply no way to store any more energy within the draw while maintaining a given peak weight and let-off.

Don't buy a bow for its looks alone. Compound bows are relatively new, and there are some Edsels on the market. Talk to an experienced archer and ask what bow he shoots and why. Buy your bow from a store that specializes in archery equipment. These merchants will often let you shoot several bows and aid you in selecting a bow that fits your draw length and weight capabilities. Here are some things to remember:

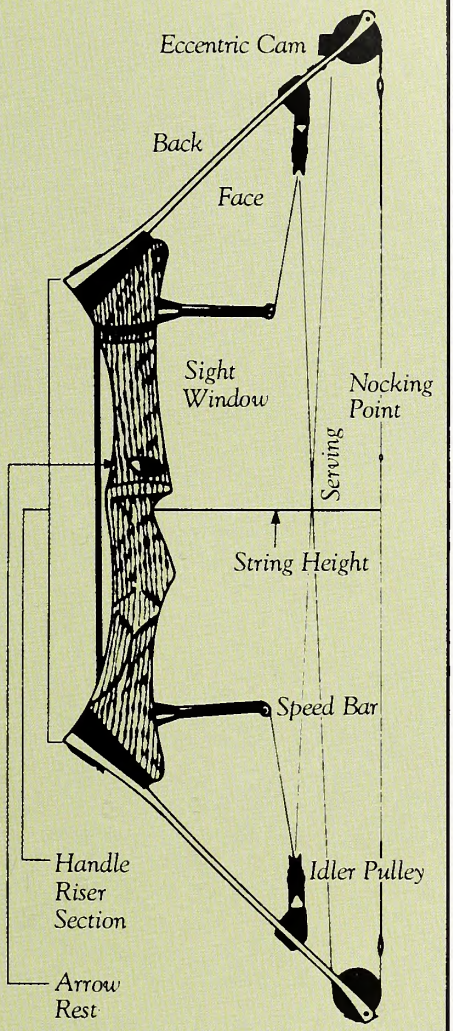
(1) Pulleys mounted at the limb tips on metal hangers are heavier than slotted mountings and, thus, reduce arrow speed.
(2) Bows possessing a high percentage of let-off are easier to hold, but store less energy than bows with lower percentages of let-off.
(3) Four-wheel compounds usually offer a higher degree of adjustability than do two-wheel compounds.
(4) Longer bows tend to be more stable and pinch the fingers less when drawn.

The Arrow

It has been said that an inexpensive bow matched with quality arrows will group well, but the best of bows groups poorly with mismatched arrows. An arrow is considered matched to a particular bow when its degree of stiffness blends harmoniously with the bow's power. Too much stiffness or spine, and an arrow flies left. Too little spine, and an arrow may fly left or right. This matching of arrow to bow is the first step to accurate shooting.

Once the arrow is free of the bowstring, the stabilizing effect of the fletching comes to bear. You may play it safe with the more forgiving natural feathers or opt for the more durable plastic vanes. Feathers are deflected less by an accidental brushing with the bow during release. Plastic fletching, however, offers superior uniformity and is inpervious to the elements.

The Compound Bow



You can regulate your arrows' stability by controlling the size, number, and orientation of the fletching used. Three-fletch arrows are most common, but sometimes in an effort to gain better bow clearance, arrows with four smaller fletching are used. Small fletching mounted in-line with the shaft offer the least stability. Their mild parachute effect is only adequate for the lightest of target arrows. To stabilize heavier shafts, larger fletching must be offset either left or right to the shaft's axis. This mounting causes an arrow to corkscrew through the air, stabilizing itself in a manner similar to a perfectly-thrown spinning football. Most bow-hunters demand three 5" long helically spiraled fletchings to guide their heavy broadheads and field points. The reason is simple — stability. The helical mounting is similar to the offset mounting, but creates more drag and rotation by exposing a larger area of fletching to the airstream. When buying or fletching arrows, remember as a rule of thumb that it's better to "overfletch" than "underfletch."

Wooden arrows are still around, but most serious archers favor the more durable and warp-resistant aluminum, fiberglass or graphite shafts. Alumnium shafts are noted for their straightness, but they may take a permanent bend upon striking a hard object. Usually, you can straighten them fairly well by hand, or better yet, with a mechanical straightener. While fiberglass and graphite shafts may not be as uniform as aluminum arrows, they are capable of accuracy greater than most of us can shoot, and they're tougher. Graphite shafts are the latest thing. They combine the toughness of fiberglass with the lightness of aluminum.

Tackle

All the paraphernalia one uses in the sport of archery is called tackle. Archery tackle has become rather specialized in recent years, but all tackle serves either to protect the archer or to aid in his success. First of all, you must "tame" the bowstring before you can shoot the bow comfortably. During the draw, a bowstring will bite into your fingers unless a shooting glove or tab is donned. Anyone who's ever been struck on the forearm by a released bowstring doesn't have to be told twice to wear an armguard. Lash this inexpensive device to your forearm and it will absorb the sting of the bowstring.

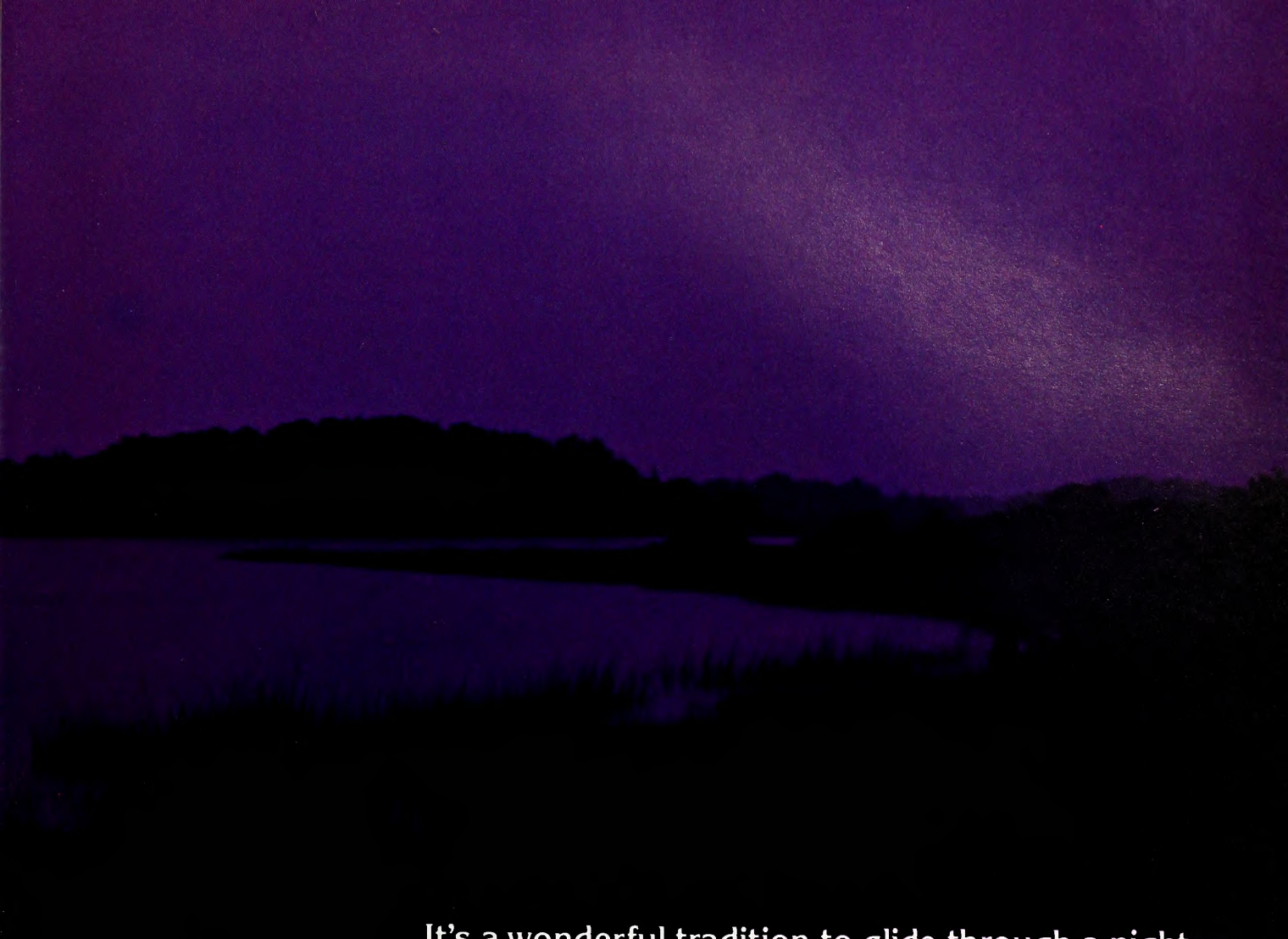
Without a doubt, one of the best investments you can make is a bowsight. When used in conjunction with a string peepsight, it forms a system akin to the front and back sight on your rifle.

If you have trouble holding your bow still while aiming, try a bow stabilizer. Actually, the list of archery accessories is endless, but most tackle is highly specialized and not for the average archer.

The Spirit of Archery

Archery is a sport rich in tradition. Unlike some sports, whose origin can be traced to one particular country, archery's roots are international. The ancient Turks mastered the recurve bow as did the English the longbow. Centuries later, American ingenuity developed the compound.

There are those who feel archery has advanced too far. These purists prefer the additional challenge offered by the recurve and longbow. No matter which bow you shoot, however, the arrow is still propelled by the archer. It is this close association that makes the bow more than a shooting instrument — it's an extension of the archer himself. ⊠



It's a wonderful tradition to glide through a night marsh gigging flounders. Even the mosquitoes love it.

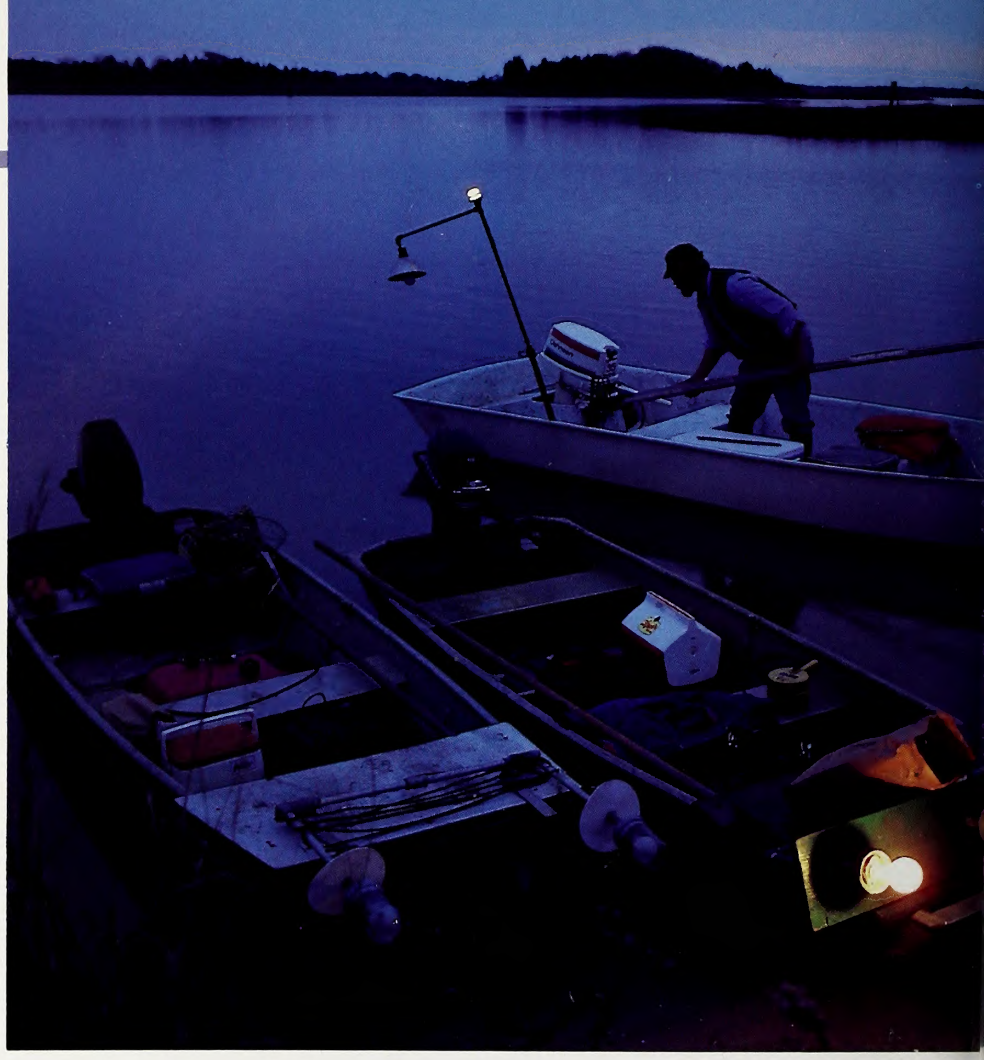
Gigging And Swatting

written and photographed by Curtis Wooten

Lights from the small skiff threw a 6-foot circle of brilliance into the night, penetrating the shallow water and illuminating the sandy bottom. Eerie shadows danced across the marsh. A man, his face and torso lit by the yellow glow, eased his craft along, scanning the channel bottom intently, a 10-foot flounder gig in one hand. Pinfish, gar and minnows frolicked in the light; shrimp and crabs edged their way into the shadows. He ignored them all.

He raised his gig as the outline of a flounder materialized, and then he relaxed. It was only the flounder's imprint in the sand. The fish that camouflages itself by fluttering its fins on the bottom and kicking up a protective blanket of sand had moved.

A few minutes later another outline appeared, a flounder this time. The man raised the gig, calculated the difference between the actual and observed position of the fish — caused by the refraction of the water's surface — and with a quick jab pinned the 3-pound fish to the bottom. After a brief struggle, the flounder was lifted into the boat.



Flounder gigging is a sport with obvious table benefits for many North Carolinians. It takes place nightly in the spring, summer and fall in the estuaries and tidal waters of the Carolina coast. It is called "strike fishing" along the lower portion of the Pamlico River, but on Harkers Island and portions of the Outer Banks where Elizabethan English still flavors the language, old-timers refer to it as "bloind stobbin" — blind stabbing to us inlanders. South of Wilmington it is sometimes called "proggin" or "jobbin."

The terms "bloind stobbin," "proggin" and "jobbin" probably relate more to the 19th-century daylight flounder "gigging" than they do to the nighttime efforts that are common today. In the 1800s friends and neighbors would fetch their pitchforks from the barn and convene at the edge of the sound or tidal creek at low tide. There they would enter the water and work their way through tidal pools, three or four abreast, blindly stabbing the bottom in front of them. When a flounder was "forked," the fisherman would reach down and, lifting the fish on the tines of the pitchfork, flip it into a burlap bag carried over the shoulder or floated behind. Flounder were apparently more plentiful then, for the technique is said to have been rather productive. It is still used occasionally today.

Two thousand years ago, Romans speared fish at night using an artificial light and a gig. The Greeks knew about the method before them. It's likely that long before the first Englishman set foot at Manteo Indians were spearing flounder and other fish using the light from pine knot torches.

By the late 1800s coastal fishermen had refined the system to some extent by rigging a cast iron pot so that it could be swung over the side of their boats. The pot was filled with "lightwood," the rosin rich heartwood of the longleaf pine, and set afire to provide light for a night's fishing. It was a dedicated lot that used this method. Lightwood gives off a tremendous amount of smoke and fishermen would come in after a night on the water black with soot and more than a bit bleary-eyed.

For awhile in the late 1800s and early 1900s kerosene lanterns were used, but they weren't much better than pine knots. The dim yellow light didn't penetrate the water's surface enough to see well.

It was the development of the gas lantern, with its intense white light, that brought flounder gigging into its own. Since the late 1940s and possibly earlier, recreational fishermen have been wading the shallow sandbars near inlets in the summer and fall, lanterns in hand, spearing flounder bedded there. Others, including some commercial fishermen, attached one or two lanterns to the bow of small, flatbottomed skiffs, and poled their way along the edge of the Intracoastal Waterway and tidal creeks that threaded their way through the marsh.

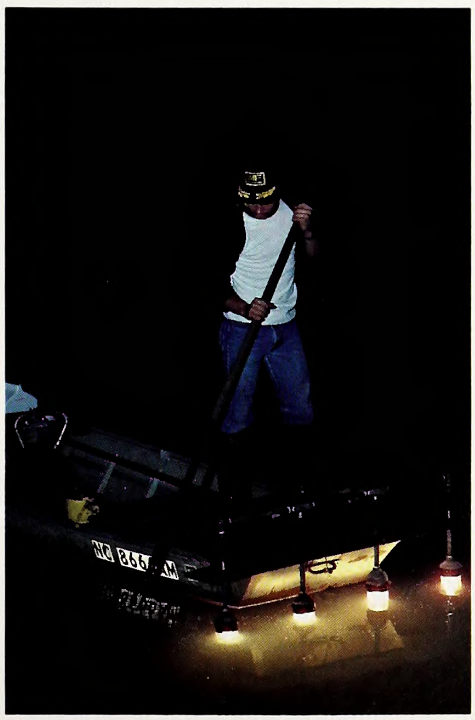
I first flounder gigged in the early '60s with such a skiff and lantern. At the time both could be rented at Davis's at Sneads Ferry for $2 a night. An evening's fun hasn't been so inexpensive since.

In the mid '50s some unknown inventor came up with the idea of encasing a 12-volt light bulb in a waterproof marine globe and attaching it to a fully charged battery to provide light for gigging. A good battery would burn a 50- or 75-watt bulb for the better part of a night and since both the bulb and globe could be placed under water, much less light was lost to reflection from the water's surface. Visibility improved markedly — as did flounder-gigging success. The use of lightweight portable electric generators soon followed, providing an even better source of electricity.

One sultry night in late August back in the mid '60s, I recall watching what I thought was a well-lighted research vessel motor slowly along the edge of the Intracoastal Waterway toward me. It turned out to be just a fellow flounder gigger, poling a skiff equipped with a generator that powered a string of four 200-watt lights immersed below the bow of his boat and two more along each side. The Waterway bottom within a 15-foot radius of the boat was lit in a fashion that would have made Jacques Cousteau proud.

I have since fished from a generator-equipped boat and found the additional light helpful, but the noise bothered me and such gear is expensive.

The marsh is tranquil at night. Frogs, night herons, gulls and other marsh creatures produce a symphony of calls, sounds that are lost when a generator is used. Floundering becomes less of an outdoor experience and more of an exercise in picking up as many fish as possible. There's nothing wrong with that, I suppose, but for me, the promise of a few fish for the table and the experience of a



At dusk, boats are launched and lights are checked for an evening of gigging in the shallow sound waters, behind inlets and along salt marshes (top left). Aluminum johnboats are a favorite, but any flat-bottomed, stable boat will work. Curtis Wooten (above) admires his 10½ pound flounder. Giggers try to strike the fish just behind the head to avoid ruining too much meat (lower left). Fancy light rigs powered by onboard generators are sometimes used, but such rigs are not cheap (near left).

night on the marsh is enough to keep me coming back. Sheer numbers of fish are unimportant.

The principle behind flounder gigging is simple. As the tides change, flounder move into shallow water — often only a few inches deep — where they settle and wait to ambush small fish that swim past. Flounder are found in the shallows during the daytime, but can see the approach of a would-be gigger and "run" before he gets within reach. At night, however, they move into even shallower water and the flounder gigger, using darkness as a cover and a bright light which blinds or mesmerizes the fish, can easily get close enough to plant a gig.

Techniques and equipment vary, but here are a few of the secrets.

Flounder giggers fall into two schools — those who gig while wading and those who gig from a boat. Waders generally work the

Flounders are invariably filleted unless they are fairly small, in which case they are often cooked whole after being stuffed with crab meat. This sprawl of flounders will make several memorable meals.

large sandbars around inlets, and along the shore of brackish rivers and the Intracoastal Waterway on warm summer nights. A growing number work the ocean surf in November. Some still use a handheld gas lantern as a light source, while others opt for the brighter light of a high-intensity spotlight or standard 12-volt lightbulb encased in a waterproof marine globe. The power source is generally a battery which is either floated behind on an inner tube to which a plywood bottom has been strapped, or carried in a backpack. Backpackers use a small battery of the type used in a lawn mower or motorcycle.

Wading can be productive, but it has a few disadvantages. The deep water and mud restrict the areas that can be fished in this way, and oyster shells, broken glass and rusty nails are hazards to look out for. People who gig while wading generally wear old shoes or boots and use a spear, with a stringer attached to it rather than the standard barbed gig. Flounder that are speared are simply pulled up the spear shaft onto the stringer and pulled along behind.

Gigging flounder in the surf, principally in November, can be productive, but the backpack light rig is the only one that works well there. Light from a handheld lantern is reflected by surf foam, and a battery towed in an inner tube is often flipped by waves. East-West beaches offer the best surf gigging after several days of light northerly winds calm the waves. Chest waders make the cool November waters more comfortable.

A 12- or 14-foot aluminum johnboat is the most popular choice of those who gig from a boat. They are light, yet stable enough to stand up in, and large enough to carry the necessary gear and a small outboard. Almost all have some type of bow cap or platform from which the gigger poles the boat and gigs and to which the lighting frame is attached. Other equipment may include a box designed to help remove flounder from the gig, one or more 12-volt batteries or a portable generator and a cooler with ice, cold drinks and snacks. I usually throw in a crab net. If flounder are scarce, crabs provide a welcome diversion and prevent me from going home empty-handed. Some giggers use electric motors to propel their boat and install swivel seats on the bow cap, but most stand and pole.

The gig itself generally is a standard three- or five-prong model which can be found in most coastal hardware stores. It is generally attached to a 10- to 12-foot section of wooden closet rod which can generally be found at the same stores.

Although flounder can be found anywhere in the salt and brackish waters of the coastal region at any time of the year, they are a migratory fish. Consequently flounder gigging is better at some locations at certain times of the year than others.

Flounder spawn in 50 to 100 feet of water off our coast in December. The adults and young slowly begin to make their way back into the estuaries in March. By April the water temperature has warmed to the point that flounder can be found in the shallows. By then the air temperature is fairly comfortable for giggers. April, May and June generally offer good gigging around inlets, as fish move from the ocean back into the estuaries. As summer progresses, larger fish move farther up tidal creeks and rivers into brackish water, getting fat on the abundant food supply found there. It is in mid-summer that gigging is best along the lower Pamlico, Neuse and Cape Fear rivers.

When the water temperature begins to drop, generally in early September, flounder begin a quick, six-week migration back to the ocean concentrating for a period near dozens of inlets found between Manteo and Calabash. This is when serious flounder giggers get going.

The ideal night for flounder gigging is a moonless, windless night after a period of low rainfall in September, October or early November. The water is generally clear then and there's less plankton in the water, improving visibility. Windless nights are more common.

Wind is a problem for two reasons. It creates ripples on the water surface which make visibility difficult, and the waves it creates beat against the shore, stirring up silt and muddying the water.

The times just at dark and right before dawn are usually best for gigging because more flounder seem to move into the shallows to feed then. The best tide is a rising one shortly after dead low tide.

At high tide look for flounder near the bank, at low tide in deeper water — generally as deep as you can see.

Moonless nights are best, but if the moon is out, fish with its light in your face. With the moon at your back you cast a shadow which generally spooks the flounder before you have a chance to gig it.

Flounder tend to frequent the same areas from year to year and if you fish regularly, eventually you find where these areas are. Sandbars along the Intracoastal Waterway near tidal creeks are almost always productive as are almost any shallows near drop-offs. It's more productive to hit the hot spots, working your way around every hour or so, rather than just poling around the marsh.

If you're fishing from a boat, keep an eye on the tide. Getting caught up a tidal creek on a falling tide is no fun. You may have to pull a stranded boat over a mud flat or sandbar to get it out. When dawn breaks the flounder begin to run at the approach of a gigger, so it's time to go home — whether you're tired or not.

Twenty years ago catches of 150 to 200 pounds of flounder per night were not uncommon. The flounder population has since declined, probably because of man-made changes in the estuarine environment. A 30- to 50-pound catch for a night is considered good today, but it's not unusual to come home empty-handed. That certainly doesn't discourage most flounder giggers, though. They know that there's far more to this kind of fishing than just catching fish. ⊠

Hunting Season Roundup 1983-84

North Carolina Hunting Seasons 1983-84

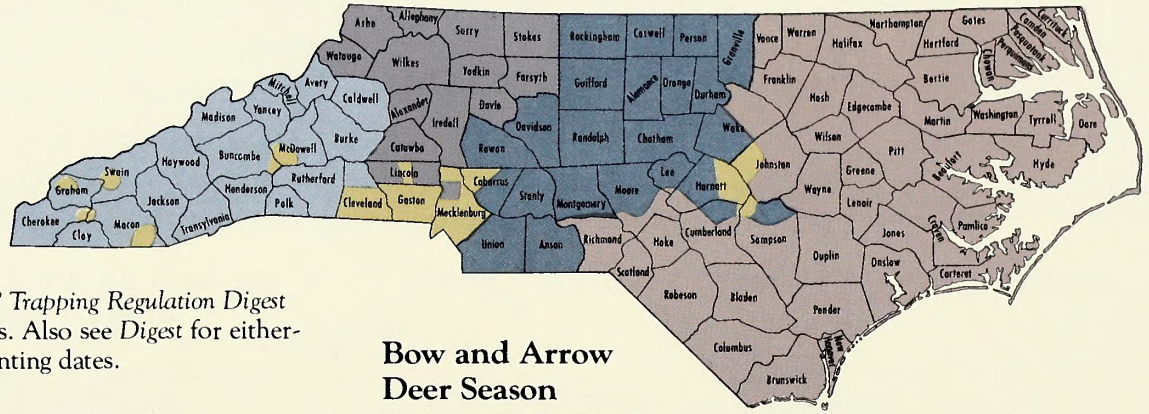
Species	Hunting Season	Daily Limit	Possession	Season
Dove	See "migratory game birds" below			
Crow	Sept. 1-Nov. 26 May 9-June 13	No restriction		
Deer (bow and arrow, no firearms)	*Sept. 12-Oct. 8 *Sept. 12-Nov. 12 *Sept. 12-Oct. 8 and *Oct. 17-Nov. 19	*2 *1 *1 *1	*2 *2 *2 *2	*4 *4 *2 or 4 *2 or 4
Deer (muzzleloading)	*Oct. 10-15 *Nov. 14-19	*1 *2 *1	*2 *2 *2	*2 or 4 *4 *4
Deer (visible antlers)	*Oct. 17-Jan. 2 *Nov. 21-Jan. 2 *Nov. 21-Dec. 10 *Nov. 21-Dec. 3	*2 *1 *1 *1	*2 *2 *2 *2	*4 *4 *2 or 4 *4
Deer (either sex)	See Regulations Digest			
Black Bear	*Oct. 17-Nov. 2 and *Dec. 12-Jan. 2 *Nov. 14-Jan. 2 *Dec. 12-Jan. 2 (Brunswick & Columbus counties) Nov. 14-Nov. 19 (Jones & Pamlico counties)	1 1 1 1	1 1 1 1	1 1 1 1

Fox Squirrel	*Oct. 17-Jan. 31 (only in 17 counties. Season closed elsewhere. See Regulations Digest)	*1	*2	*10
Ruffed Grouse	Oct. 17-Feb. 29	3	6	30
Raccoon	*Oct. 17 (sunrise)-Jan. 31 *Oct. 24 (sunrise)-Feb. 29	See Regulations Digest		
Opossum	*Oct. 17 (sunrise)-Jan 31 *Oct. 24 (sunrise)-Feb. 29	No restriction		
Wild Boar	Oct. 17-Nov. 19 Dec. 12-Jan. 2	1	1	2
Woodcock	See "migratory game birds" below			
Pheasant (nonnative) (male pheasant only)	Nov. 19-Feb. 1	3	6	30
Rabbit	Nov. 19-Feb. 29	5	10	75
Rabbit (box trapping)	Oct. 1-March 31	5	10	75
Quail	Nov. 19-Feb. 29	10	20	100
Bobcat	*Dec. 12-Jan. 31 *Dec. 12-Feb. 18	No restriction		
Wild Turkey (bearded turkey only)	*April 7-May 5	1	2	2
Migratory Game Birds	Unavailable at this time; Federal regulations may be obtained by writing: Director, U. S. Fish and Wildlife Service, Washington, D. C. 20240			

*Seasons and bag limits vary from location to location; check your *North Carolina Hunting and Trapping Regulations Digest* for complete details. For a copy of the Digest, write: N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Archdale Building, Raleigh, N. C. 27611.

Gun Deer Season

- Nov. 21-Dec. 10
- Nov. 21-Dec. 3
- Closed season
- Oct. 17-Jan. 2
- Nov. 21-Jan. 2



Note: See *North Carolina Inland Fishing Hunting & Trapping Regulation Digest* for exact boundaries and other deer-hunting details. Also see *Digest* for either-sex seasons and special game-lands seasons and hunting dates.

Bag Limits

■■■ Daily 1; Possession 2; Season 4, including deer killed elsewhere, except in and west of Madison, Buncombe, and Rutherford counties the limit is Daily 1; Possession 2; Season 2. May include 2 antlerless deer where legal.

■ Daily 2; Possession 2; Season 4, including deer killed elsewhere. May include 2 antlerless deer where legal.

Bow and Arrow Deer Season

(No Firearms Permitted)

- Sept. 12-Oct. 8
- ■■ Sept. 12-Nov. 12
- Sept. 12-Oct. 8 and Oct. 17-Nov. 19

Muzzle-loading Deer Season

(Antlered Deer Only)

- ■■ Oct. 10-15
- ■■ Nov. 14-19

North Carolina Deer Season

North Carolinians are blessed with good hunting. Deer, black bear, wild boar and wild turkey are all found here, and are considered big game. There is also excellent hunting for squirrel, rabbit, quail, dove and grouse.

The first thing any hunter needs is a license, and the best buy for the all-round outdoorsman is the sportsman's license. This license includes all appropriate permits for hunting big and small game and fishing. For those who only hunt small game, a statewide hunting license may suffice. However, permits for big game hunting and primitive weapons must be bought separately. Perhaps the best option for the serious outdoorsman is to buy a lifetime license. Five of these lifetime licenses are available — including the sportsman's license for adults, youths, infants and lifetime hunting and fishing licenses. The sale of these licenses supports the Wildlife Endowment Fund, with only the annual interest being used for wildlife conservation. Eventually, the fund will play a major role in supporting wildlife conservation in North Carolina. Licenses are available from license agents across the State, and information on lifetime licenses is available from license agents, Wildlife Commission employees, or by writing the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Finding a place to hunt is generally no problem. North Carolina has over 2 million acres of public hunting areas enrolled in its game-lands system. For the price of a game-lands use permit (which is included in the sportsman's license), sportsmen can hunt or fish on these public lands. Game lands are located throughout the State, and information is available free by writing to the N.C. Wildlife Resources Commission, Game Lands Maps, 512 N. Salisbury St., Raleigh, N.C. 27611.

Big-game hunters should also be sure to tag and report all kills. Big game — which includes deer, black bear, wild turkey, and wild boar — must immediately be visibly tagged at the scene of the kill. These tags are provided when hunters purchase big-game permits or sportsman's licenses. Then, the hunter must report the kill to a nearby wildlife cooperator agent. There are over 1,100 wildlife cooperator agents located throughout the State — watch for their diamond-shaped signs at country stores, sporting goods and other businesses. The cooperator agent will fill out a big-game kill report. A duplicate of this card is given to the hunter, and serves as a permit to possess the animal. Later, information from the big-game kill reports is used to determine harvests and other trends. Copies of the annual big-game harvest reports are available by writing to the N.C. Wildlife Resources Commission, Division of Wildlife Management, 512 N. Salisbury St., Raleigh, N.C. 27611.

Wildlife belongs to everyone, and you may observe people breaking wildlife regulations in the field. If you observe a violation, call the Wildlife Commission's toll-free Wildlife Watch Hotline at 1-800-662-7137.

Curtis Wooten

Heating With Wood

Good tips for both beginner and expert. And you won't leave wildlife out in the cold.

by Terry Shankle

In recent years, countless families have turned to wood to heat their homes, and others may join them this winter. It is not necessarily a simple decision. For some, it involves considerable expense — the purchase of a stove, a chain saw, wood splitter and such miscellaneous equipment as axes, nails, wedges and gloves. You may even wind up buying a pickup truck or trailer or building a woodshed. Add in the time it takes to gather wood, the hard work, the frustrations . . . .

Ah yes, the frustrations. An old hand at wood burning can tell you of the flat tire on a loaded truck, the mud hole with no bottom, the tree that fell the wrong way, the lump under the tire that turned out to be the chainsaw. Blisters, bruises and splinters.

Still, a lot of people think it's worth it, and if you know what you're doing, it probably is. With that in mind, here's some information that should be helpful to both the neophyte and old hand. And while we're about it, there's a related, yet very important matter to consider — one that is often overlooked. Your warm hearth at home may be leaving many wildlife species out in the cold. Fortunately, you can do something about that, but let's start from the beginning.

SOURCES FOR FIREWOOD ABOUND

Unless you're going to buy firewood that has already been cut, your first consideration is how to locate a source of suitable wood.

Farmers clearing land are always a source of firewood in rural areas. Some charge by the truckload while others sell a small area to each cutter. Still others give the wood away on a first-come, first-served basis. If you're acquainted with some farmers, you might ask if they need any fields "cut back." Farmers have long known that as trees grow out over fields they shade crops causing poor growth. In addition the low-hanging branches are a nuisance to machinery operators. They often would like the trees cut back but lack the time. Incidentally, one important point to make here concerns liability. Anyone who allows firewood cutting on his property should seek a bit of legal advice about liability for injuries.

Electrical power companies sometimes buy and clear new rights-of-way for transmission lines, but all companies have crews constantly trimming existing lines. While these crews can't give you permission to cut wood, they usually have contact with the landowners and can direct you to them.

Logging operations leave tons of wood behind in the form of laps, and getting to know the timber crew or the land owner might open new sources of prime firewood. Just remember to cut only what's already down unless otherwise instructed. Large construction projects where land is cleared can also provide sources of wood for the person who takes time to ask, and small, independent contractors who clear housing sights might also be a source.

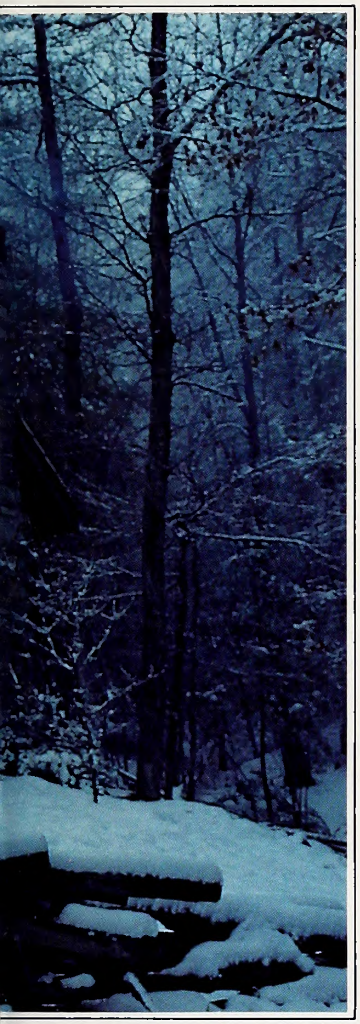
Finally, if you live near U.S. Forest Service or Wildlife Resources Commission property, you're in luck. Both agencies allow some limited firewood cutting each year on a permit basis. Check with the local ranger office or game lands depot.

Possibly you're lucky enough to own land that contains enough trees for a lifetime of wood burning. If you fall into this group you are indeed fortunate, but have you practiced good woodlot management? By that I mean have you cut trees that are diseased, damaged, crooked, or pose a threat to buildings, fences, or other good trees? Have you cut trees in a planned way that will enable the woodlot to continue to furnish firewood on a perpetual basis? Several pamphlets on small woodlot management are available from governmental agencies such as the U.S. and N.C. Forest Services. The N.C. Forest Service also has its experimental Hill Forest in Durham County where a five acre woodlot is being managed to produce a perpetual supply of good quality firewood.

WILDLIFE HOMES NEED NOT BE SACRIFICED

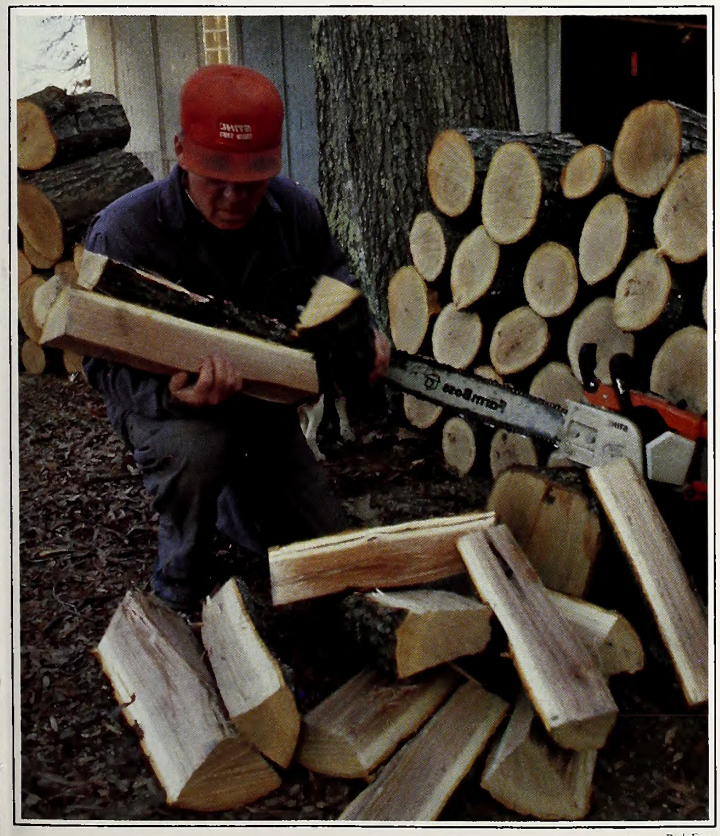
And now for the critters! Do you leave den trees that can be homes for squirrels, coons, wood ducks, possums, owls, and song birds? Do you leave trees along streams so the root systems will retard erosion? Do you burn all your brush piles or do you pile them in an out of the way place to rot while at the same time providing cover for animals?

For example, the objective of all the work done on game lands owned by the Wildlife Resources Commission is to improve wildlife habitat. Areas such as Caswell, Sandhills, and Thurman Chatham game lands are prime examples of areas where wood is



Curtis Wooten

Cutting wood in fall and winter is best because the sap is down and the wood dries more quickly. To speed the drying process, split the large pieces and keep the cut wood dry. Wood fires can be enjoyed without unduly affecting homes for wildlife if a few simple rules are followed. Don't cut trees with denning or nesting holes. They provide space for squirrels, raccoons, wood ducks, possums and other creatures. Leave brush piles as cover for small game species, and leave trees along streams as buffers to retard soil erosion.



Rick Estes

harvested with wildlife in mind. Mike Seamster, a Wildlife Commission forester, oversees the timber management on the Caswell Game Lands in the upper Piedmont.

"All the timber-stand improvements we undertake on Caswell are done to improve wildlife habitat," explained Seamster, "and the cutting of firewood by private individuals always plays a part in work done on a site.

"All firewood taken from Caswell Game Lands must be gathered under a permit issued by the Wildlife Commission," said Seamster, "but it enables wood to be taken in several ways. The largest amount of firewood comes from areas that are marked for timber stand improvement. Often this improvement involves thinning of certain trees that we mark so firewood cutters can easily distinguish them from the trees we want left. The boundaries of the entire block are also marked so that people will only cut the correct areas.

"We also allow firewood cutters to take any dead and down timber from along the side of the roads through the Caswell Game Lands," said Seamster. "In addition we permit the removal of laps in areas where we've had timber sales. The few small areas that we sometimes clear-cut also provide firewood from laps and trees left standing by the commercial loggers because of their small size," Seamster added. "We try to mark the areas with access in mind so that firewood cutters can get in and out of the areas without damaging their vehicles.

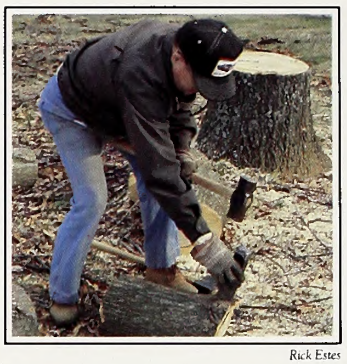
"We leave den and nest trees, and the hardwoods that are most beneficial to wildlife species. Beech, white oak, post oak, and hickory are the trees most favored by wildlife, but we strive for a diversity of hardwoods. Having a wide range of species with different times of fruit maturity lengthens the time that nuts and berries are available for wildlife. Diversity also makes the mast crop more predictable because late frosts will not kill late blooming varieties. This same approach can be used for private woodlots."

Seamster agreed that the biggest conflict between cutting wood and wildlife is the fact that the most preferred firewood trees are also the best producers of wildlife food. Commission-owned game lands are being managed towards an ideal combination of 50 percent hardwood and 50 percent pine to provide both the foods provided by hardwoods plus the cover of early-growth pines. "On Caswell we also windrow stumps and brush allowing them to rot while at the same time providing cover for animals and birds. Any of our practices here can be adapted for use on small woodlots as well as large timbered areas. We also don't allow firewood to be taken from April 1 until June 15 during nesting season and on Mondays, Wednesdays, and Saturdays during the hunting seasons to avoid conflicts between hunters and firewood cutters."

SELECT QUALITY WOOD, AND CURE IT PROPERLY

All wood will burn and provide heat. Poorer quality firewood, while not producing the heat per amount of wood burned as more favored varieties, can still be utilized by mixing it with better

Ken Taylor



Rick Estes

Rick Estes

Ken Taylor

All About Firewood And Wildlife

Tree	All Wildlife	Songbirds	Upland Game Birds	Fur and Game Mammals	Value as Firewood	Remarks
Oaks	Excellent	Excellent	Excellent	Excellent	Excellent	Retain a variety of species.
Black cherry	Excellent	Excellent	Good	Good	Good	May have high timber value when mature.
Apples	Excellent	Good	Good	Good	Excellent	Rare; attractive to grouse.
Pines	Excellent	Excellent	Fair	Good	Fair	Good as kindling.
Flowering dogwood	Excellent	Excellent	Good	Fair	Excellent	High Aesthetic qualities.
Maples	Good	Good	Fair	Excellent	Excellent	High Aesthetic qualities in fall.
American beech	Good	Fair	Fair	Excellent	Excellent	Aesthetic in the fall; important to squirrels.
Birches	Good	Fair	Good	Good	Excellent	Important to northern wildlife.
Spruces	Good	Good	Fair	Good	Fair	Good as kindling; important to northern wildlife.
Hackberry	Fair	Good	Fair	Fair	Excellent	Important winter food for songbirds.
Hickories	Fair	Fair	Fair	Good	Excellent	Especially attractive to squirrels.
Ashes	Fair	Fair	Fair	Fair	Excellent	Supplies mast in the fall.
Eastern hemlock	Fair	Fair	Fair	Fair	Fair	Attractive to northern wildlife.
Black locust	Fair	Fair	Fair	Fair	Excellent	Low wildlife; high firewood; nitrogen-fixer.
Eastern red cedar	Fair	Good	Fair	Fair	Fair	Good as kindling; attractive to songbirds.
Sweetgum	Fair	Fair	Fair	Fair	Fair	High water content when green; high aesthetic value.
Sycamore	Fair	Fair	Fair	Fair	Fair	Aesthetic; high water content when green; hard to split.
Yellow-poplar	Fair	Fair	Fair	Fair	Fair	Good as kindling; aesthetic.
Willows	Fair	Fair	Fair	Fair	Fair	Attractive to northern wildlife.

Curtis Wooten

A sledge hammer, wedges and an ax (facing page) are all you need to split wood. Stacking method illustrated on far left allows air to circulate, dries wood quickly. Though cedar (facing page, right) and oak are excellent as firewood, they also provide cover and food for wildlife and should be burned sparingly.

wood. It can also be burned at times when you're at home all day and can tend to the fire more often. For every tree of poorer grade firewood that you burn, a tree that's of more benefit to wildlife has been left in the forest.

By all means, make an effort to cut firewood during the late fall and winter when the sap is down. Besides producing better quality firewood than firewood that's cut when the sap's up, the cool weather makes cutting more comfortable. But if the opportunity arises to obtain free wood for the asking, don't let it slip away.

Always be on the lookout for "lighter stumps" when you're cutting firewood. "Fat wood," as it's also sometimes called, is heart wood of a long dead pine tree. Most often it's in the form of a stump from which all the sapwood has rotted years ago leaving only the turpentine-saturated heart that all but defies rot. One medium-sized stump chopped into finger-sized pieces will light your fires for an entire winter. With it, there's no need for kerosense or other flammables to start your fire. If you wonder whether the stump you've found is "lighter," chop off a small piece with your ax; the strong smell of turpentine will be evident.

The method you use to dry your firewood may depend on the space you have and the time of year you cut the wood. As stated earlier, winter-cut wood dries better and more quickly due to its lower initial moisture content. Drying can be speeded up by several methods. Splitting large pieces is the first rule to remember for quicker drying. The second is to keep the wood dry to prevent rot. Solar driers using a wooden frame covered with clear or black plastic hastens drying through the use of heat trapped inside the structure. Drying can also be speeded by stacking the wood in vertical stacks with every other layer at a right angle. This stacking method requires slightly more room but works well because it allows for good air circulation between the pieces of wood.

A tip can also be taken from our grandparents who generally had wood sheds where they stacked and dried their wood. Since wood was often their only source of heart they knew that lighting wet wood was hard. And besides, the woodshed was a place to take kids who misbehaved. Even today that reason alone might justify a woodshed near every house and behind each school. A woodshed some distance from the house also keeps the bugs that munch on your wood from possibly munching on your house. In addition, it's much cleaner to bring dry wood into the house. And finally a woodshed is a great place for birds to build nests. In fact, this spring my woodshed was home to a Carolina Wren, a Carolina Chickadee, and a Flycatcher.

BUY A GOOD STOVE AND USE IT SAFELY

One saying that older folks passed along to their woodburning offspring is, "a little green wood will make the fire last through the night!" That statement was and still is true of burning an open fireplace or older Franklin or pot-bellied stoves that had numerous air leaks. The air leaks, even though small, didn't allow total control of the air supply entering the firebox. Consequently overnight fires would nearly always burn out before morning unless green wood was used.

Newer airtight stoves, as well as the older Scandinavian models heat longer using less wood and are a boon to today's society where fewer people are at home during the day to maintain a fire. But airtight stoves have made burning anything other than well-seasoned, dry wood a no-no. The reason is creosote, that black, sticky, smelly residue that can clog smoke pipes, cause chimney fires, discolor roofs, chimneys, hearths, and expensive rockwork.

You cannot totally free yourself from creosote and still burn wood. But you can cut down on its production. Cutting wood two or more years ahead and keeping it under cover will help. Not burning any green wood will also help, and allowing the stove to burn hot at least twice a week will aid in slowing down creosote buildup. Steer clear of products that claim to burn creosote out of the stove and chimney. These products might cause adverse affects on both the stove and chimney. Creosote is best removed with a wire brush run up and down the chimney when a flashlight inspection indicates a cleaning is necessary.

Stove manufacturers are now marketing stoves with catalytic devices that are either built into the stove or can be added to the stove pipe. These devices react with the existing heat coming from the fire to produce extreme heat through which the smoke must pass. This heat further burns the volatiles remaining in the smoke. The system serves two purposes. It cuts down drastically on creosote buildup in the smokepipe and chimney, and it also makes the smoke going into the atmosphere less of a pollution hazard. That is important in areas where there is fear that firewood burning might lead to restrictions because of environmental problems.

One final stove design worth a comment is the multipurpose stove that provides both heat and hot water. These stoves, being large, are placed some distance from the house in their own small building. This fact alone reduces the housefire possibility to nearly zero in addition to keeping all the dirty aspects of woodburning away from the house.

The following statement shouldn't be necessary but it is: Always remove ashes from the stove, place them in a metal container and get the container away from the house. Sounds foolish to repeat every year, but homes continue to burn due to careless disposal of wood stove ashes. Let the ashes cool and broadcast them over the garden. An even better place to spread them is around grape vines.

Woodburning has truly returned as an alternative to conventional oil, electric, or gas home heating. Convenience has given way to the daily routine and sometimes bother of keeping a warm fire burning. But the bad experiences of woodburning are tempered by lower electric bills, the family outings to cut and haul firewood, the kettle of boiling water that's always available, and, best of all, the heat you had during last winter's power outage.

And if you go about it with a bit of thought, your use of wood need not deprive wildlife species of their homes. ⊠

Rick Estes

An Uncommon Bird

What would you call a bird that gives milk and flies by compass? Try mourning dove.

by Carl W. Betsill

The mourning dove is hardly the gloomy bird one might suspect from its name. Indeed, the name comes from its call, an admittedly mournful half coo, half whistle that is commonly heard across North Carolina in the summer and fall. You may also have heard this bird called the turtle dove, which explains the oft-quoted reference to the "voice of the turtle" — meaning dove *(Zenaida macroura)* not amphibian.

These birds are appreciated not only for their handsome plumage and song, but also for their swift flight and tasty meat. Perhaps no bird is more widely appreciated by both birdwatcher and hunter alike, and because of their prolific nature, their numbers remain high.

But while the mourning dove may be common here and elsewhere, it belongs to one of the most interesting and mysterious families of birds in the world — the pigeon family. There are 11 different dove species native to the United States. Three others, including the rock dove or domestic pigeon, have been introduced from other parts of the world and have become established as permanent wild residents. In North Carolina, only the domestic pigeon and the mourning dove are common.

All pigeons or doves have small heads and short legs, eat grain, seeds or fruit, and bob their heads when they walk and they also give milk. That's right! That's one of the things that make them interesting. Both parents feed their young a white creamy milklike substance produced by their crops. A bird's crop or craw is a storage chamber for food before digestion begins. The parents regurgitate a mixture of crop milk and seeds into the nestling's mouth. The crop is quite different from the milk-

photography by Ken Taylor

John Dombrowski and his Brittany, Ranger, anticipate incoming dove (left and above). At John's shot, Ranger is off to retrieve and deliver the kill which will be part of a tasty meal later. Doves are among our most abundant birds, and are a favorite of hunters. Mortality for doves may reach over 80 percent each year from disease, predation, starvation and other natural causes. Yet, the dove population faces this loss each year regardless of whether the birds are hunted. The approximately 10 to 14 percent of the dove population killed by hunters substitutes as a form of predation.

producing glands of mammals, however. Milk is not really secreted by the crop, but is made up of cells from the lining of the crop itself. These cells become filled with fat globules and are shed from the lining. So actually adult pigeons feed their young with cells from their own body.

Okay, doves or pigeons are interesting but why are they mysterious? Well, they possess one of the most fascinating and least understood talents in the animal kingdom — the ability to navigate. Specially bred domestic pigeons, never removed from the vicinity of their loft, will return to their loft if taken and released hundreds of miles away. Research in this field has uncovered some interesting things. A recent article in *National Geographic* (August 1979) pointed out that pigeons use both solar and magnetic navigation to navigate by. For example, on sunny days, they may use the sun to guide themselves; however, on cloudy days, they can go on "instrument" the same as a commercial jetliner. By using a guidance capability based on magnetic north, they can still find their way. Scientists proved this by equipping pigeons with small mag-

netic caps to confuse their bearings. On sunny days, these birds did not get lost, but when it was cloudy, they became confused and were unable to fall back on their interior compasses.

Other researchers hypothesize that pigeons use smell, hearing and a variety of other senses in navigating. Pigeons can detect even minor changes in barometric pressure, see ultraviolet light invisible to humans, and hear infrasound, or noise in very low frequencies and long wave lengths. With this ability, *National Geographic* pointed out, pigeons flying up the Mississippi Valley might hear a thunderstorm over the Rockies and at the same time hear the surf pounding at Cape Hatteras!

Although most of North Carolina's doves remain in the State — over 80 percent of the doves harvested here are home grown — we also get influxes of long-distance travelers from New York, New England, Michigan and Minnesota. Those doves use the same types of remarkable and little-understood navigation abilities as all their pigeon kin.

To those of us who have wasted a box of shells on opening day of dove season and come home empty-handed, it is little wonder that the mourning dove is one of the most abundant birds in the U.S. But stop and think about it. A dove has feet so tender it can't scratch for food, and nest-building habits so sloppy that only half produce young. Hunters harvest 50 million a year and it's still one of the nation's most abundant birds. How?

Unlike quail and some of the other more industrious seed eaters, the dove will only feed on seeds that are in plain sight and preferably lying on bare ground. He's not about to get in there and dig around for it like a common ole chicken! As for nest building, the dove doesn't work any harder at this than he does eating. A few pine needles in the fork of a limb will do.

One year, while searching for dove nests as a part of a nesting study conducted by the Wildlife Commission, I ran across a dove sitting on a nest about 15 feet above the ground and out on the end of a pine limb. Normally we use a mirror on a long pole to look inside the nest to examine the contents. In this case it wasn't necessary, for when the dove flew, two eggs could be easily seen right through the bottom of the nest. I was sure this nest wouldn't make it but, to my surprise, it survived marble-size hail and 20 mph winds, and produced young birds.

After hearing this you may begin to think like an old farmer I met down in Wayne County. He didn't need to be told about dove nesting or feeding habits because he was one of those rare individuals who paid attention to what was going on around him. Anyway, he said: "You know the dove has got to be just about the laziest bird there is."

At first I thought I agreed with him but when I thought about it some, I had to disagree. You see, what a dove lacks in workmanship he makes up for with mass production. You might say he places his emphasis on quantity rather than quality. A complete nesting cycle from courtship to flying young requires only 30 days. If a nest is destroyed a new clutch of eggs can be laid in two to five days. The time between successful nesting isn't long either. In fact, often while the male is taking care of 10 or 11 day-old young the female is already sitting on two more eggs in another nest — mourning doves always lay two eggs. Believe it or not, they keep this going eight or nine months out of the year. This must be the equivalent of humans having seven or eight sets of twins, with each set born while the previous two were still in diapers. There's nothing lazy about an animal that would do that!

As for the dove not scratching for his food, he has a certain adaptation that lets him get away with this, too. Some birds — quail, white-throated sparrows, and other seed eaters — have to stay and feed close to the edge of a field. By doing this they can quickly escape into the cover in case trouble threatens. Since more species have adapted to this edge there's a good bit of competition for food. In fact, they have to scratch around and hunt for it. The doves, however, are able to feed in the center of the field avoiding the competition. Out here they find the seed in plain view. By feeding in flocks and having superb flying abilities they have overcome the disadvantage of being so far from escape cover.

Paul Errington, a famous biologist and expert on predator/prey relationships, once said: "Nature's way is any way that works." So the next time you think of the lazy old dove and its half-hearted attempts at nest construction and feeding, don't knock it. Five hundred million doves out there are proving it works! Remember, too, the next time you are out dove hunting or watching a dove at your bird feeder that you are watching one of the most amazing animals in the world. It contains a navigation system more accurate than that on any aircraft; a barometer more sensitive than most weather stations; it can see light and hear sounds we are not even aware of; it feeds its young with part of its own body and most important — his head bobs when he walks.

Often Seen On Outer Banks

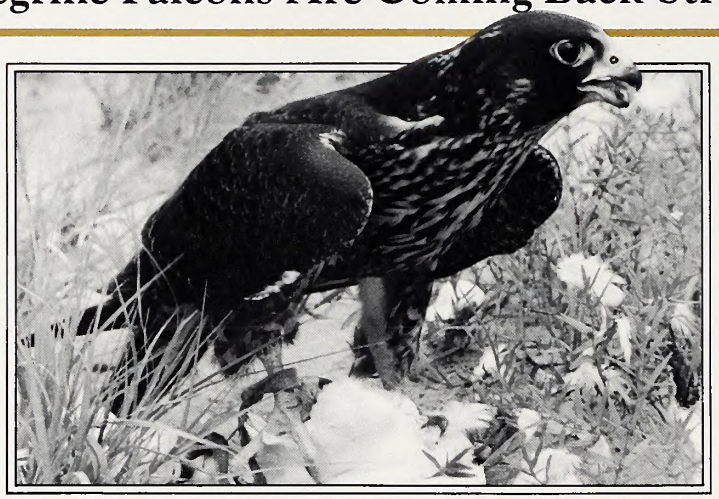
Peregrine Falcons Are Coming Back Strong

Written and Edited by Mark Taylor

Peregrine falcons, those magnificent birds of prey which approach speeds of 200 miles per hour when they swoop down on their quarry, are making a comeback, reports the Cornell University Laboratory of Ornithology. Like many other birds of prey, peregrine falcons were decimated by the use of DDT and similar "hard" pesticides during the 1950s and 1960s. Since the use of DDT and other hard pesticides has been banned in this country, however, peregrine populations have been increasing.

In North America, peregrine falcons have increased considerably since 1975. On the Colville River of Alaska's North Slope, for example, there were 27 cliffs occupied by nesting peregrine falcons this year compared to only 13 to 15 nesting pairs of birds in the early 1970s. On the Yukon River, peregrine falcons are now nesting at or above 1950 levels. And on the Tanana River where peregrines experienced their most severe decline in Alaska, there are several nesting pairs compared to only a single nesting pair in 1970.

The news from Europe is even better. In Great Britain, a stronghold for peregrine falcons, a population that was reduced in 350 nesting pairs in 1963 now totals more than 1,000 nesting pairs — and shows no signs of slackening. This is the highest known level of nesting for peregrine falcons in Great Britain in this century.



Jack Dermid

Just Stopping By: *Peregrine falcons are often seen on the Atlantic coast during their fall migrations. In North Carolina, the best time and place to see peregrine falcons is in October at the Pea Island National Wildlife Refuge on Cape Hatteras.*

This increase in peregrine numbers is good news for bird-watchers. Record numbers of peregrine falcons are now being seen along the East Coast. One day last fall at Cape May, New Jersey, a record 50 peregrine falcons was seen in one day. Researchers at Assateague and Chincoteague islands in Virginia recorded more than 600 peregrine falcon sightings in 1982. The North Carolina coast is also an excellent spot to see peregrine falcons.

"The Pea Island National Wildlife Refuge near Cape Hatteras is the best place to see peregrine falcons in North Carolina," said David Lee, an ornithologist with the N.C. Museum of National History. "October is the peak month for peregrine sightings, although the birds pass through the area from September through the winter months. With a little effort, any bird-watcher who spends a couple of days at the refuge in October should see some peregrines."

Peregrine falcons are also seen on the uninhabited portions of the Currituck Banks. The birds often rest on the beaches and dunes, and prefer to hunt in large, open salt marshes.

"North Carolina doesn't match the numbers of peregrines seen in Virginia for several reasons," said Lee. "Assateague and Chincoteague islands are real hotspots for peregrine falcons, and full-time observers are used to record bird numbers. In North Carolina, we depend on bird-watchers to report sightings. These islands are also popular spots for peregrines to touch down to rest. Then, the birds fly out to sea and leapfrog their way down the coast — some may not return to land until they reach South Carolina or even Georgia. It's not unusual to sight a migrating peregrine falcon 50 miles offshore."

Treasures Close To Home

Reader Reports Bigger Tar Heel Mill Ponds

Dear Sirs:

I just wanted to let you know that I thoroughly enjoyed all of the articles on old North Carolina millponds which you have published — including "Merchants Mill," "Down by the Old Mill Run," and "The Grist of History." I too, am a "student" of these cypress-studded treasures. More than once, I have driven miles out of my way just to take a look at one that I had "discovered" on a topo or country road map.

Forgive my nitpicking, but at 600 acres Merchant Mill is not the largest in the State. That distinction belongs to Holts Lake in Johnston County at somewhere around 2,000 acres; then there are Bladen's Suggs Mill (800 acres) and Rhodes Pond in northern Cumberland County (also 600 acres). And while Orton Pond at historic Orton Plantation was used primarily to flood rice fields, I'm sure it did some double duty as a mill pond in its day. I'm not sure of its size, but it is truly massive. These are the largest ones that I have found, and there may be others that would outrank them.

Thank you for these and many other fine articles. Yours is the finest outdoors magazine in print today, bar none. But you have a tremendous advantage over everyone else. You have the "goodliest land" to work with.

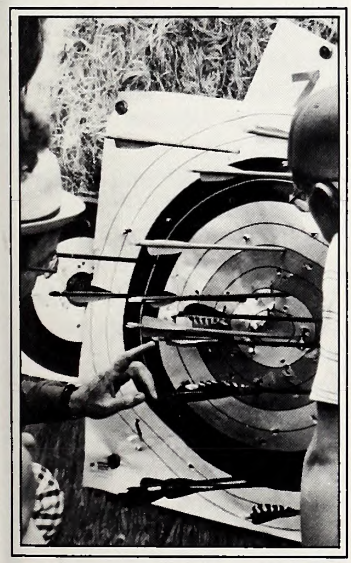
— Ed Bullard
Raleigh

And Save A Few Dollars

Robin Hoods Take Note

Whether you are a beginning archer or a seasoned veteran, you're probably always looking for new ideas — especially those that will save a few dollars. Here are a few.

One of the first items an archer must obtain is a suitable backstop. A good backstop will hold a target securely, and will also stop an arrow without damage. Retail dealers offer many targets, but these are often quite expensive. Large blocks of polyfoam have become popular, but a ride through any part of North Carolina will reveal dozens of blocks of foam that have literally been shot to pieces. In the past few years, demand has also made the price of foam rise considerably. Excelsior bales also make good backstops, but are quite expensive and extremely heavy.



Ken Taylor

It Takes A Licking: *A good backstop is essential for any archer, but those available commercially often cost a pretty penny. One option is to build your own out of corrugated cardboard.*

A cheaper alternative is to use large, corrugated boxes which are widely available. The flattened boxes should be stacked to a thickness of approximately one foot and carefully and tightly bound together with nylon-reinforced tape. When set upright, it makes a fine backstop. Both field points and broad heads may be shot into these targets with no damage to the arrows. Best of all, because it's cheap you don't feel bad about throwing the backstop away when it begins to come apart. It's also biodegradable.

Do you ever get disgusted after pulling and tugging on arrows when trying to remove them from the target? If so, keep some wax paper handy and occasionally rub down the entire length of the arrow shaft below the fletchings. You'll be amazed at the ease with which the arrows can now be removed from the target.

Do you shoot into the same place on the target shot after shot, and keep breaking nocks? If so, you've reached the consistency necessary to be a successful bow hunter, but you're also ruining expensive arrows.

If money is no object and you get a charge out of "Robin Hooding" arrows (hitting one arrow with the point of another which ruins both), read no further. However, if saving a dollar is one of your virtues, try placing a small mark on a larger target for each arrow you plan to shoot. This uses more of the total area of the target, keeps arrows from damaging each other, and extends the life of the backstop. Also, most archers feel that it's better to shoot at smaller targets.

— *Terry Shankle*

Proclaims National Hunting And Fishing Day

Governor Honors Sportsmen

Hunting and fishing are two of the nation's most popular pastimes, and more than 1 million Tar Heel citizens participate in these two sports, contributing over $540 million to the economy of North Carolina annually. North Carolina Governor James B. Hunt Jr. recently recognized the sportsman's contribution to conservation by proclaiming Saturday, September 24, as National Hunting and Fishing Day in North Carolina.

"Hunters and fishermen have traditionally constituted one of the largest groups of citizens who are concerned about our wildlife resources and environment," said Hunt. "Much of the financial support for sound management and conservation of our wildlife resources is paid for by hunters and fishermen. Sportsmen have also consistently led the way in our quest for clean air, water and a future for wildlife. It is with great pleasure that I recognize their tremendous contribution to wildlife conservation by proclaiming September 24 as National Hunting and Fishing Day in North Carolina."

Ken Taylor

In Your Honor: *Governor James B. Hunt Jr. recently proclaimed September 24 as National Hunting and Fishing Day in North Carolina to honor the sportsman's role in conservation. Here, Robert Gordon (left), chairman of the N.C. Wildlife Resources Commission, and Mike Mann, executive vice-president of the North Carolina Wildlife Federation, look on as Governor Hunt signs proclamation.*

Fees Raised

Boaters who purchase a motorboat that was previously owned and registered in North Carolina are now required to pay the full fee to transfer the boat registration to their name. This fee is $5.50 for one year, and $13 for three years. A new owner may operate a boat on the previous owner's valid registration for 30 days to allow sufficient time for the transfer.

Transfers of registration are handled through the N.C. Wildlife Resources Commission, Motorboat Registration Section, 512 N. Salisbury St., Raleigh, N.C. 27611.

Flounder Are Tops

The Fish For People Who Hate Seafood

Of all the popular saltwater fish, the flounder is undoubtedly the most popular on the dining room table. Part of that popularity likely stems from the fact that there are at least 200 species of fish that go by the common name of flounder. Species found in Carolina waters range from the tiny windowpane flounder — which seldom grows larger than a third of a pound — to the popular summer flounder which may exceed 20 pounds. Three species — the gulf, summer and southern flounder — are generally taken by fishermen here.

"It doesn't taste like fish," is one of the reasons flounder is so popular, particularly with those who don't turn flips at the thought of fish for dinner. Delicately flavored, flounders are very tasty with even the simplest of recipes. Yet, its flesh also has enough character to hold up to strong sauces, stuffings, and spices and herbs. Flounder also fillet more easily than most fish. This versatility is what makes flounder so popular with a wide variety of fish connoisseurs.

About the only way to ruin flounder is to overcook it, which, unfortunately, is done all too often. The average flounder fillet is thin, and a few minutes of heat on each side is enough. Much more than that and you get something close in taste and texture to cardboard.

Small flounder, those less than a foot long, can be scaled and broiled whole. Fish larger than that should be filleted, which is simple. With the flounder on its side, eyes up, using a flexible fillet knife make a cut from just behind the gill cover to the tail. This cut should follow the spinal column which runs almost in the center of the body. Then, pushing the knife blade lightly against the backbone, follow the rib cage to the outer fins and lift off the wedge-shaped fillet. Do the same thing to the other side of the backbone, then flip the fish and repeat the maneuver.

To remove the skin, simply slide the blade between it and the fillet. The hide is tough and coarse and separates easily.

For a change of pace, prepare your fillets using the following recipe. You may find that you'll want to add it to your list of regulars.

Jim Dean

A Tar Heel Favorite: *Almost everyone likes flounder — even people who say they don't like fish. Overcooking is about the only way to ruin this fish.*

FLOUNDER FLORENTINE

1 1/2 pounds flounder fillets
1 pound fresh spinach
4 tablespoons butter
salt and pepper
1 teaspoon seasoned salt
1 tablespoon chopped parsley
2 tablespoons flour
1 cup light cream
1 tablespoon Madeira
paprika

Wash spinach, remove stems and drain. Cook in a saucepan for a few minutes (without water) until wilted. Drain again and chop. Heat 2 tablespoons of butter in a small pan until it is brown. Mix with spinach. Add salt and pepper to taste. Put spinach in the bottom of a shallow baking dish.

Sprinkle fish with seasoned salt. Roll each fillet up, and place the rolls on the spinach. Sprinkle with parsley. Melt the rest of the butter in a saucepan and blend in flour. Slowly add cream and cook until thick. Correct salt and pepper. Add Madeira and blend. Pour sauce over fillets. Sprinkle with paprika. Cover and bake in preheated 350-degree oven for 25 to 30 minutes until fish flakes when probed with a fork. Serves four.

— *Curtis Wooten*

Convenient For Sportsmen

Hunting-Fishing Licenses Have A New Look

North Carolina sportsmen have no doubt noticed some changes in the formats of fishing, hunting and trapping licenses and regulations digests. The Wildlife Commission recently consolidated the fishing and hunting and trapping regulations digests into a single regulations digest covering all three sports, and also adopted a new "passbook" license for hunting, fishing and trapping licenses. The new license format features a single "passbook," and sportsmen purchase stamps which are pasted into the passbook that signify various hunting, trapping and fishing license privileges.

"There were several reasons for these changes," said Debbie Paul, assistant to the director of the Wildlife Commission. "We believe that the passbook licenses will be more convenient for license agents and sportsmen. License agents will need to keep only one license form on hand, and sportsmen and license agents will benefit by having the regulations consolidated into a single digest."

Wildlife Officer Rescues Boy

Just Another Routine Patrol?

It was Sunday, the 29th of May. Danny Pierce of Candler, a wildlife enforcement officer with the Wildlife Resources Commission, left his home for what he thought would be a routine patrol of the French Broad River. It turned out to be one of the most meaningful and memorable days of his life.

"I was driving along the river in Buncombe County when I saw the accident," Pierce recalled. "A car and a truck had collided and were lying in the ditch. I was the first authority on the scene. After looking in the car, I radioed the staff duty officer who mans the Wildlife Commission radio system in Raleigh and requested that he notify the local rescue squad. The mother and father were unconscious and severely injured, and in the back seat were two young children. A three-year old was removed by emergency personnel from the Skyland Fire Department, but a five-year old boy was trapped in the back seat by the crushed-in side of the car."

Officer Pierce began talking to the boy, trying to keep him calm. "His name was Matthew, and he was doing real fine. We talked about things he liked to do — like horseback riding and playing with his friends. He was a real brave boy. Then, suddenly someone was yelling 'the car's on fire.' "

Sparks from a partially severed battery cable had ignited the engine compartment, and flames were leaping up in front of the windshield. Officer Pierce sensed Matthew's fear, and told him, "Just hang in there, I'm not going to leave you."

While Pierce comforted the boy, emergency personnel were able to cut the battery cables and put the fire out with a fire extinguisher. Then, using a cutting tool called the "Jaws of Life," the back door of the car was removed and Matthew was freed.

In that brief moment when one person reached out to comfort another during a life and death situation, Officer Pierce and Matthew came to know and care for each other. As they carried Matthew to the ambulance, Officer Pierce waved good-bye and said, "We'll see you later, they'll take care of you now."

— Jay H. Davies

Book Review

The Deer Of Dixie

Mid-winter in Raleigh means it's time for the Dixie Deer Classic. This popular event, which is sponsored by the Wake County Wildlife Club, usually attracts around 4,000 die-hard deer hunters to the North Carolina State Fairgrounds. Displays of the best racks taken in the State are among the most popular features.

If you missed previous Dixie Deer Classics, you may wish to catch up by obtaining a copy of the *Official North Carolina Records of the Dixie Deer Classic.* Produced by Allen Basala of the Wake County Wildlife Club, the publication contains interesting articles on the event and deer hunting. Charts are included showing the Boone and Crockett scores of the best deer taken in several categories in North Carolina, and maps show where most of the winning deer entered in the classic were taken.

While much of this information is quite technical, die-hard deer hunters will find the publication interesting and useful. Copies are available for $6.50 (including mailing) from the Wake County Wildlife Club, Dixie Deer Classic, P.O. Box 12202, Raleigh, N.C. 27605.

Suggests Limiting Use

Reader Finds Fish-Finders Controversial

Dear Sirs:

I am fourteen years old. I am a monthly reader of your magazine *Wildlife in North Carolina.* I find that it is very interesting, and enjoy it very much. However, I have yet to come across an article in protest to the so called electronic fish finders. It is my firm belief that these aids should be outlawed in the State of North Carolina's inland waters. It would by my hope that in future legislature these aids be made illegal.

— Miss Elaine Reece
Andrews, NC

Dear Miss Reece:

Thank you for your letter about the electronic fish finders. We're pleased that you like *Wildlife in North Carolina,* and hope your family does too.

We doubt that you'll see fish finders outlawed here. There are several reasons. They are popular and fun to use. But the most important reason is that they really don't seem to cause any harm. Most of them are used only to show the bottom contour so that you can find a good spot to fish, and although they reveal "blips" which indicate fish of some sort, you have to make an educated guess as to what kind they are. A few are more sophisticated, and you can tell more about what you're seeing, yet even then that does not guarantee that anyone will catch what's there. Although they are very helpful in finding underwater channels, dropoffs and other good spots, depthfinders are not terribly effective at pinpointing specific fish which can then be caught.

It's true that overfishing can hurt gamefish populations, and rods and reels, lures, boats, motors and all the other gear have been greatly improved in recent years. But you might as well outlaw bass boats, graphite rods and plastic worms since they surely contribute to more caught fish than fish finders. The real problem is not sophisticated gadgetry. It's pollution and sometimes too many fishermen concentrating on certain areas. Fortunately, the Wildlife Commission can change regulations to help species of fish in the face of increasing pressure. Creel limits and size limits can be adjusted as they have recently for bass. There are also special regulations on striped bass, trout, muskies and other species, especially in certain areas where they need greater protection.

You can't legislate against every new fishing gimmick that hits the market, especially when the real problem lies elsewhere. But we'll do our best to make sure the regulations continue to protect our fishing.

— Jim Dean

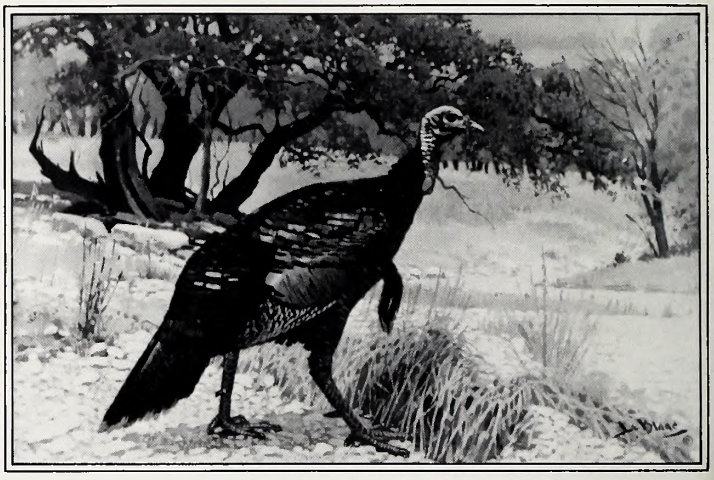
Buy A Stamp

Give A Wild Turkey A Helping Hand

Would you like to help a wild turkey? One way is to invest in one of the limited-edition prints of the 1983 wild turkey stamp offered by the National Wild Turkey Federation, a national organization which is dedicated to the restoration and conservation of the wild turkey in the United States.

The 1983 wild turkey stamp print was done by well-known wildlife artist Lee LeBlanc, and is entitled "Sultan Stroll." Funds from the sale of prints and stamps will be used for wild turkey conservation programs.

For more information, contact the National Wild Turkey Federation, P.O. Box 467, Edgefield, South Carolina 29824.



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1983-84 North Carolina Wildlife Calendar

Six nationally known wildlife artists have contributed fine outdoor and wildlife paintings to the 1983-84 calendar. Their paintings are in museums and private collections throughout the country, and you've seen examples of some of their work in WILDLIFE IN NORTH CAROLINA magazine. This calendar is almost certain to become a valuable collector's item with such artists featured as:

- Bob Binks
- Bob Dance
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- Larry Barton
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Calendars are $5 each; however, if you purchase 50 or more, we will sell them to you for only $4 each.

This is a project of the Chairman's Wildlife Advisory Committee, a group of North Carolina conservation leaders who have been appointed by the Chairman of the Wildlife Resources Commission to provide information, guidance and support for the agency's wildlife conservation programs. Proceeds from the calendar will go for these purposes.

Yes, please send me _____ copies of the North Carolina Wildlife Calendar. I have enclosed cash, check or money order for _____. We do not bill.

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Return form and payment to Chairman's Wildlife Advisory Committee, care of George Mason, P.O. Box 473, Dallas, N.C. 28034 or give the form to a member of the committee. Checks should be made out to the Chairman's Wildlife Advisory Committee.

Calendar of Events

September 3
6th annual Michelob Sailing Regatta from Oriental to New Bern. For more information, contact Woodruff Distributing Company, P.O. Box 1488, New Bern, N.C. 28560

September 5
Coastal Carolina Folklife Festival at Poplar Grove Plantation in Wilmington.

September 10-11
Cary Gourd Festival in Jordan Hall on North Harrison Avenue in Cary.

September 12-16
Oregon Inlet Billfish Release Tournament. For more information, write to P.O. Box 533, Manteo, N.C. 27954.

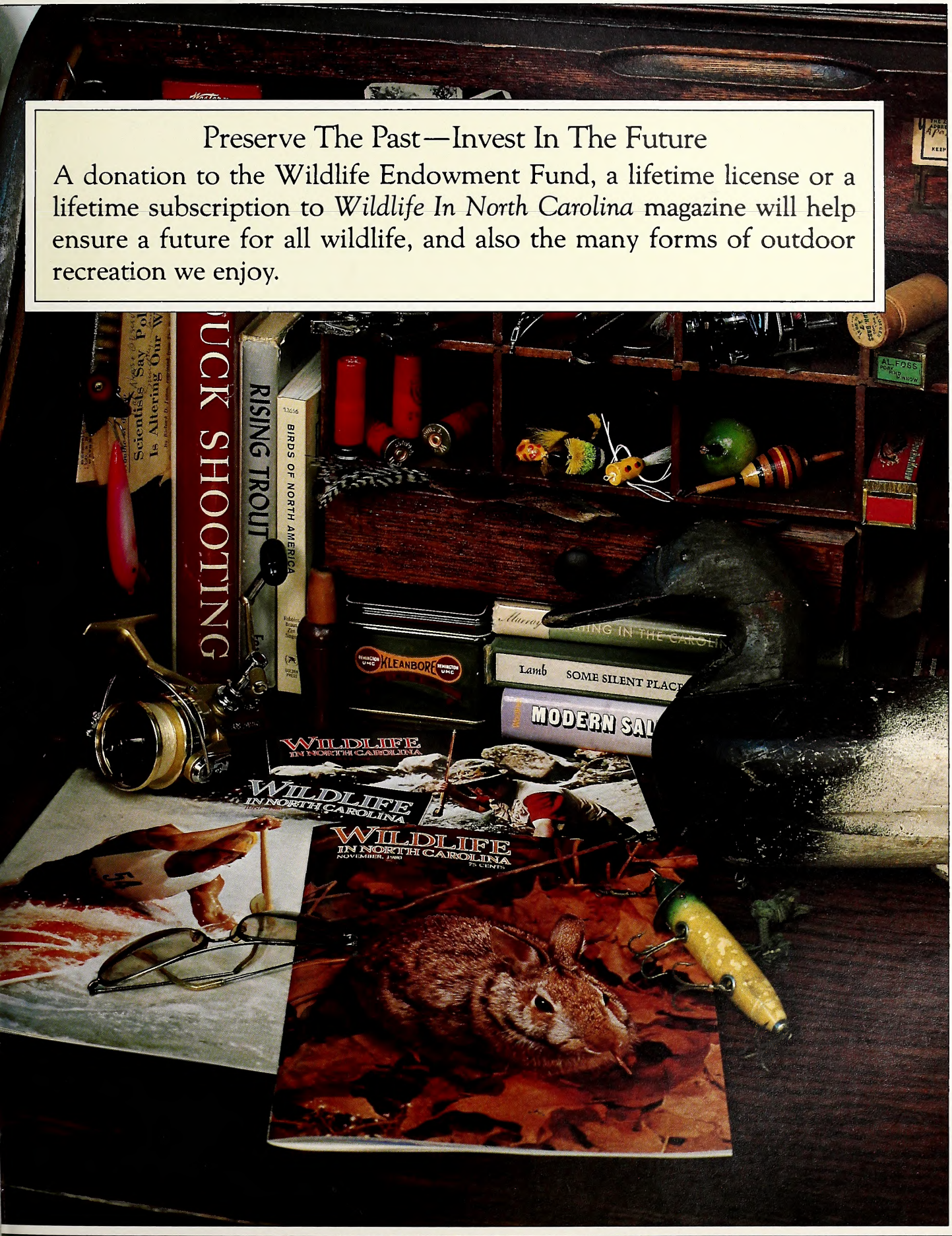
September 13-17
26th annual North Carolina State Championship Horse Show at the State Fairgrounds in Raleigh. For more information, write P.O. Box 6415, Raleigh, N.C. 27628.

September 15-17
4th annual Atlantic Beach Fire Department King Mackerel Tournament. For more information, write to P.O. Box 8, Atlantic Beach, N.C. 28512.

September 17-18
Currituck County Wildlife Festival at Currituck County High School in Barco. Sponsored by the Currituck County Wildlife Guild, the festival will feature waterfowl art, old decoys and decoy carving, and waterfowl-hunting memorabilia.

September 22-25
King Mackerel Tournament at Wrightsville Beach. For more information, write to P.O. Box 659, Wrightsville Beach, N.C. 28480.

September 24-25
Traditional Wooden Boat Show on the Beaufort Waterfront. For more information, contact the Hampton Mariners Museum, 120 Turner St., Beaufort, N.C. 28516.



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A donation to the Wildlife Endowment Fund, a lifetime license or a lifetime subscription to *Wildlife In North Carolina* magazine will help ensure a future for all wildlife, and also the many forms of outdoor recreation we enjoy.

Leaping Whitetail

In a graceful bound, this handsome buck heads for the deep woods, its tail flashing a white flag of alarm.

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WILDLIFE IN NORTH CAROLINA

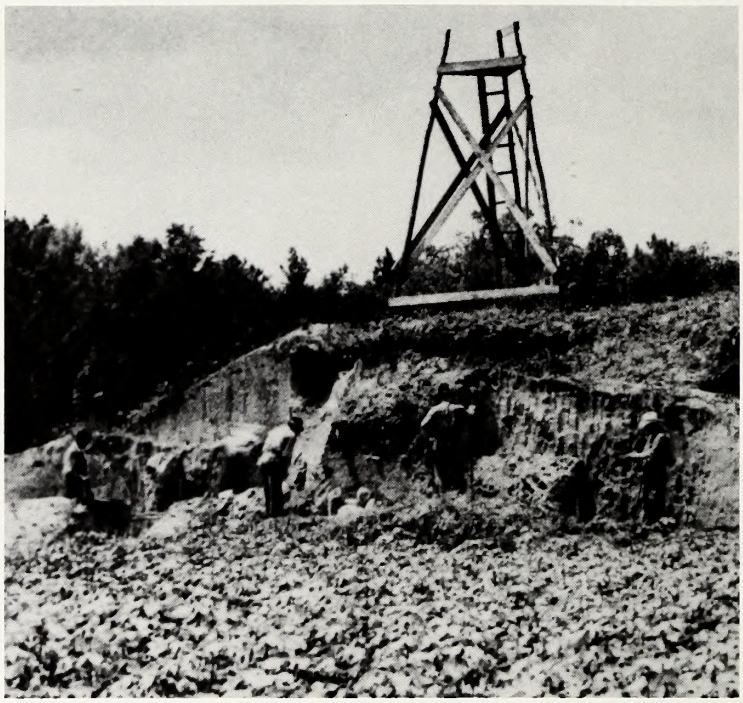
OCTOBER, 1983 75 CENTS

The Hill At Town Creek

by Jim Dean

In the early 1930s, L.D. Frutchey plowed his fields near Mt. Gilead in Montgomery County and watched his cotton grow. No doubt he had his share of problems. There were boll weevils, of course, and there was this big hill in one field. The hill was too big and steep to farm, and some people were a bit superstitious about it. The Indians made it, they said; it's full of bones. Small wonder it was largely left alone. Few people thought of it as a holy place from another time, or the center of a vibrant culture.

N.C. Archives and History



But what was a nuisance or a mystery to some was to become a fascination for others. To Dr. Joffre Coe, an anthropologist from the University of North Carolina, Frutchey's hill was reminiscent of the more famous Indian mounds elsewhere. Surely this place held significant information about a long-gone civilization. In 1936, Coe began what was to be a lengthy excavation and research of the mound, the field and the area around it. What he found added a valuable chapter in the knowledge of early Indian culture here.

This high meadow near the confluence of Town Creek and Little River has been sacred ground to Indians for perhaps 10,000 years, evidenced in part by the spear points and other artifacts found here. But the actual mound was made by Creek Indians who journeyed north out of Georgia and Alabama to displace the Souian Indians (who 100 years later, in turn, drove them out). But from about 1450 A.D. until 1550, the "People of One Fire" as the Creeks called themselves, used Frutchey's field for what must have been a wingdinger of a celebration.

When the corn ripened each summer, the Creek Indians gathered at the holy ground to begin a four-day ritual of renewal and sun worship that was often solemn, although parts of it may also have been a great deal of fun. In acts symbolic of the end of the old year and the beginning of the new one, debts were settled and all wrongs — except murder — were forgiven. Lodges were cleaned, worn-out clothes, tools and weapons were thrown away and all pottery was smashed. The cooking fire, kept going all year, was extinguished.

To cleanse themselves both inside and out, tribal members would drink tea made from Yaupon leaves imported from the coast, and this powerful emetic caused violent nausea. Warriors also scraped their bodies with combs made from the needle-sharp teeth of gar fish. This ceremony was followed by a meeting of the tribal leaders in a temple which was constucted on the mound. There they resolved important issues involving politics and religion.

Games were also an important part of the event, and perhaps the most popular involved the use of a heavy post, rackets and a hard, leather ball. Teams from rival villages played, and the object was to use a racket to throw the ball so that it would strike the post as high as possible. That it was a rough game — not unlike field hockey — is evidenced by its name which translates as "Little Brother of War."

The climax came with a feast of newly harvested corn, and as families departed to their own homes and villages, they carried coals from the temple fire on top of the mound. It was because of this last symbolic act that these Indians called themselves "People of One Fire."

During Coe's excavation and study of the area, he and his assistants carefully removed layers of earth and were able to trace the evolution of the temple mound and ceremonial ground. An earth-covered lodge supported by heavy, thatched timbers was the first ceremonial structure. In time, this collapsed and was covered with more earth to form the foundation for a new, rectangular temple. This temple was destroyed by fire and covered with more earth, and eventually the mound reached its highest level where the last of the temples was constructed.

Research also disclosed that a ramp led off the mound to a square of ground flanked by four sheds. In this sacred square dwelt the Talwa, the symbolic soul of the tribe, and it was here that the important matters of religion and politics were discussed and settled. The mound was also fortified with a stockade which enclosed the burial grounds of great warriors and tribal leaders, as well as a minor temple which housed the tribal priests. The entire site is still an ongoing archaeological project, and more recent excavations have located many of the Indian villages which surrounded the ceremonial ground.

Visitors today can find the reconstructed temple, stockade and complex much as it was before 1550 by following the signs off N.C. 73 near Mt. Gilead. Even the original posthole for the games has been located, and a new post planted there. It is a trip worth taking. One senses a heritage of sorts, passed on by the "People of One Fire." It is not unlike our own Thanksgiving when prayers of thanks are given, the harvest is celebrated and the games are begun. Perhaps we are not people of one fire, but we are not much different from those who were.

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October, 1983
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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

OCT 3 1983

CONTENTS

4 **Johannes Plott's Famous Hunting Dogs**
by Curtis Wooten
Though their early ancestors came to North Carolina from Germany, Plott hounds are recognized as a distinct American breed today.

10 **It's All In The Flow** *by Mark Taylor*
With increased use of water biologists face a tough job making sure that rivers and streams maintain an adequate flow to support fish and wildlife.

15 **First Lady Of Birds** *interview by Lawrence S. Earley*
Charlotte Hilton Green has been North Carolina's best known bird lover for three generations.

18 **North Carolina's Museum Of Natural History**
by Jane Rohling
There have been a lot of changes at this popular museum in the State's capitol. Why, you'd hardly recognize the place now.

26 **The New Passbook License** *by Mark Taylor*
Sportsmen in North Carolina have a new license to replace the multiple licenses of previous years. Here's how it works and why it is needed.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Way *by Lawrence S. Earley*

Back Of The Book *by Mark Taylor*

Cover *Autumn's carpet is a layer of fallen leaves, a patchwork of color that will gradually decompose to bring new life to the soil. Photograph by Curtis Wooten.*

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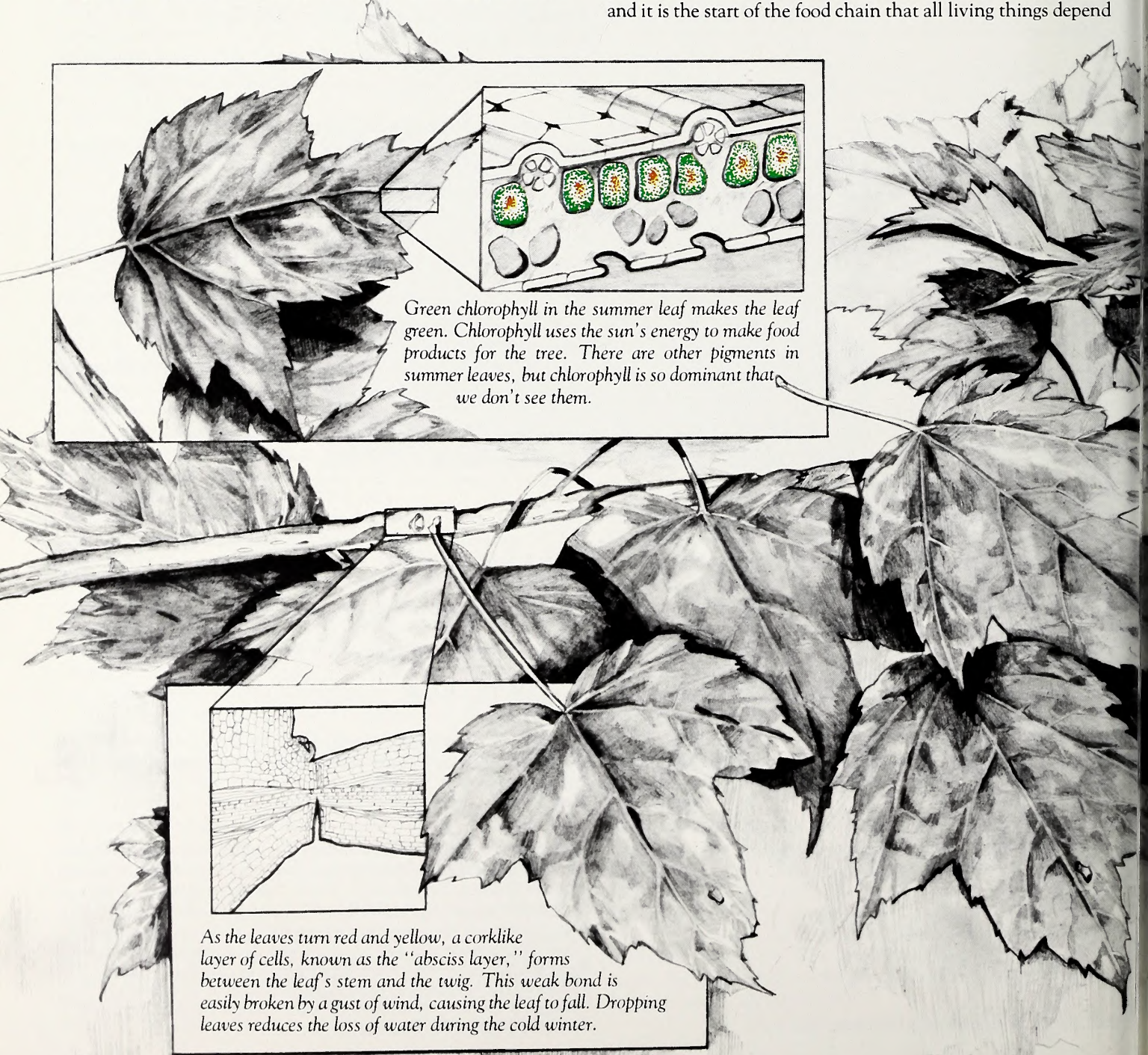
Autumn's Colorful Tapestry

by Lawrence S. Earley/illustrated by Cindy Fuquay

When the woods flame up in russets and golds in the fall, it is one of nature's grandest sights. Many of us love to keep pace with fall's progress, wondering whether the bright colors are at their peak. We'll drive many miles to gaze at the mountains where each treetop seems like a tiny knot in a multicolored carpet. And yet the brilliant hues of fall are a natural part of the aging process of leaves, a sign that the season of green growth is ending and that a harsher season of cold and scarcity is near at hand.

Why do trees turn colors in autumn?

The secret of nature's colorful show lies inside the leaf, in the microscopic space between the upper and lower surfaces. In this space are tiny pieces of matter called chloroplasts which contain a magical substance — chlorophyll. In spring and summer chlorophyll uses the sun's energy to combine water from the soil and carbon dioxide from the air to make sugar and starch — food products for the tree. This is the process called photosynthesis, and it is the start of the food chain that all living things depend



Green chlorophyll in the summer leaf makes the leaf green. Chlorophyll uses the sun's energy to make food products for the tree. There are other pigments in summer leaves, but chlorophyll is so dominant that we don't see them.

As the leaves turn red and yellow, a corklike layer of cells, known as the "absciss layer," forms between the leaf's stem and the twig. This weak bond is easily broken by a gust of wind, causing the leaf to fall. Dropping leaves reduces the loss of water during the cold winter.

upon. Chlorophyll is also the substance that makes leaves green during the growing season.

But there are pigments in the leaf besides the dominant green. In the fall as the green chlorophyll fades during the aging process of the leaf, these other pigments can now be seen, like shy children who are noticed only when their noisier friends are gone. These pigments are carotenoids, and are the yellows and oranges which are so noticeable in poplars, hickories and sweet gums. In other trees like red maples, dogwoods and birches, another pigment, anthocyanin, turns the leaves bright red.

Oak leaves also change colors. Their drab brown may not be as pretty as others, but it's an important hue in nature's fall palette. As the leaf dies, the red and yellow pigments in the oak leaf begin to break down. The chemical tannin mixes with these pigments and other substances and turns the leaves brown.

Why are some falls more colorful than others?

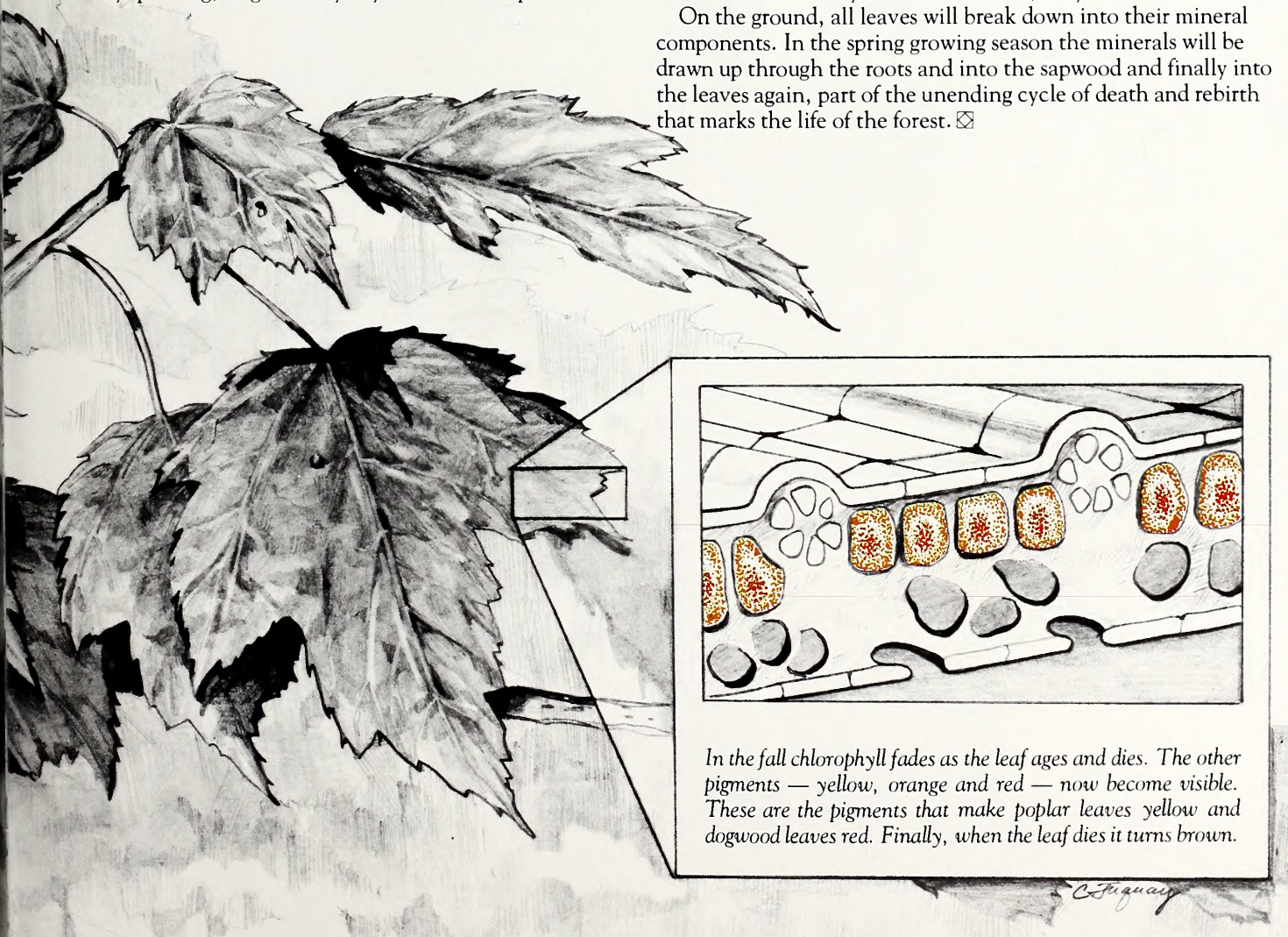
Generally speaking, bright sunny days and cool temperatures will make fall colors intense. But if the tree has endured a prolonged drought during the summer, its leaves will be less colorful even if it gets plenty of rain in the fall. In actuality, it is the red pigment in leaves that varies most from year to year. Some falls are more colorful than others because of the variations in the reds.

Why do trees drop their leaves?

Like a food-making plant shutting down for the winter, trees drop their leaves which reduces the loss of precious water during the harsh winter. As the leaves turn colors, a thin layer of cells, called the "absciss layer," develops between the stem of the leaf and the twig. In time the leaf dies. Attached by only a weak link, the leaf will be torn from its mooring by a strong gust of wind and spiral down to the ground.

The leaves of some trees do not form the "absciss layer." That's why oaks and beeches wear their dead leaves far into the winter. Attached more firmly than other leaves, they fall later in winter.

On the ground, all leaves will break down into their mineral components. In the spring growing season the minerals will be drawn up through the roots and into the sapwood and finally into the leaves again, part of the unending cycle of death and rebirth that marks the life of the forest. ⊠



In the fall chlorophyll fades as the leaf ages and dies. The other pigments — yellow, orange and red — now become visible. These are the pigments that make poplar leaves yellow and dogwood leaves red. Finally, when the leaf dies it turns brown.

"A Plott that pans out like he's supposed to is fast on the track; he's got lots of desire."

All photographs courtesy of Lawrence Plott

Johannes Plott's FAMOUS HUNTING DOGS

North Carolina's Plott hounds are recognized as the oldest —and some say best—of the American-bred hunting breeds.

by Curtis Wooten

The Plott hound can run like a foxhound, fight like a terrier, tree like a coonhound and has the nose of a bloodhound," Von Plott once said. One of six hunting hound breeds recognized by the United Kennel Club, the Plott is different from the other hounds in common use in North America today. Many claim it's more aggressive and faster, with a willing-to-mix-it-up attitude and cat-like agility in a fight. These traits endear it to the rugged mountaineers of North Carolina who chase bear, boar, raccoon and mountain lions. The Plott hound takes its name from the family that developed the breed. In a manner of speaking, the dog has been 200 years in the making, and much of that has taken place here in the mountains of our state.

The story of the Plott hound began in 1750 when two brothers who had worked as gamekeepers for wealthy landowners in Germany left that strife-torn country in search of a better life in the New World. Their provisions for life in America were meager but among them were three brindle- and two buckskin-colored hunting dogs — part of the stock their wealthy landowner employers had used to hunt wild boar and stag. The brothers thought they might be helpful in hunting the bear, buffalo and deer they had heard about in the colonies.

One of the brothers never made it to America. He died en route and was buried at sea. The other, Johannes, then 16, arrived at Philadelphia in September of 1750, took coastal boats and shanks, mare to New Bern, and traveled inland to what is now Cabarrus County where other German immigrants had preceded him. Just west of the Uwharrie mountains, he established a farm, married and fathered several sons.

The dogs he brought with him proved useful — in hunting for food as well as tracking the bear, mountain lions and wolves that preyed on his livestock.

The Plott dogs were different from other hounds found in the Carolinas at the time. Most other hunting dogs were descendents, in some fashion or another, of the English foxhounds that were popular in the colonies. The Plott dogs were not so "houndy." They were more like mastiffs with short ears, bench legs, barrel chests, somewhat pointed noses and a slightly flagged tail. Their voices were not so melodious as other hounds and they were hot-nosed — that is, they were not particularly good at following a cold track. But that was no disadvantage at the time. Bear were plentiful and dogs with expert tracking ability were not always in demand. What was needed were hounds that could take a suitably warm track, jump the game, bring the animal to bay and then hold it until hunters arrived. The Plott dogs filled that bill.

It may not be proper to refer to the early Plotts as hounds. According to Taylor Crockett, a current day Plott owner and

John Plott and an unidentified man hold a group of Plott hounds on the Plott family farm west of Waynesville, North Carolina. John and his two brothers, Sam and Vaughn (Von), were instrumental in getting the Plott hound recognized by the United Kennel Club in 1946.

Even though maimed by the slap of a big bear, the Plott will attack again — and again.

breeder who lives near Franklin, Mont Plott, the great-great grandson of Johannes "would bristle right up if you called his dogs hounds. He said they were a 'cur dog,' " a cur being a breed of hunting dog recognized by old-time mountaineers.

At any rate the Plott dogs were fierce, iron-willed dogs that could track, chase and fight black bear, mountain lions and wolves with unequaled ability. They had an intensity for the hunt and they soon had a reputation for tracking big game and holding it at tree or bay until the hunters arrived. When maurading bears or wolves raided livestock in the area, it was the Plott dogs that were brought in to hunt them down.

There is no way of knowing the exact stock of these German dogs, and the subject has given rise to a great deal of speculation. They were catch dogs used on wild boar, some say, related to the boxers and great danes. Lawrence Plott, a sixth-generation descendent of Johannes, who now lives in Waynesville, spent nearly 15 years in Germany after his first arrival there during World War II. That allowed him to do a considerable amount of research into the ancestry of the Plott dogs. He says that probably the closest relative to the current day Plott is the Hanoverian Sweisshund. The breed is old enough to have spawned the Plott dogs and was developed — and is still found — in the same part of Germany from which Johannes immigrated. Both breeds are similar in appearance, coloring and physical makeup, and they display the same hunting traits and characteristics.

Having worked with dogs in Germany, Johannes knew the importance of breeding and worked to maintain and improve the qualities of his pack. Only the best were bred and the best of their offspring kept. Those too aggressive or clumsy were killed by the quarry they brought to bay and those that showed a lack of desire or cowardice were dispatched on the spot by the hunters. These selective practices produced a breed of dogs that were clever in fighting cooperatively with other pack members when dangerous game was cornered. They produced a breed not only with the drive and guts to hold dangerous game like bear and wild boar, but with the sagacity during the showdown to survive to run and fight another day. It's a characteristic that sets the Plott apart from other hounds.

In 1780 the Plott dogs passed into the hands of Johannes' son, John. In 1800 John traveled west looking for a new home, and is said to have been shown a valley by Chief Junaluska on the eastern slopes of the Balsam mountain range in what is now Haywood county. John made claim to 1700 acres there and settled in what is now called Plott Valley, located just west of Waynesville. He and his sons soon established a reputation as renowned bear hunters and the breeders of the best "bar" dogs around.

Over the next 200 years the Plott packs passed through the hands of George,

Unusual photo from Plott family album above shows all three brothers at a bear hunt in 1932 — Vaughn, at left with golf cap; John, with rifle in the middle; and Sam, bending at right. Another bear hunt in 1932 (left) netted three bears. John Plott (below) holds a brindle-colored Plott hound in a 1938 photo.

Henry, John and in the late 1800s into the hands of Montreville (Mont) Plott. All were premier bear hunters and sticklers for maintaining the breed.

The Plott dogs stayed, more-or-less, in the Plott family over those years. The Plotts never sold a dog, although they did give them to neighbors and hunting companions. Vaughn (Von) Plott, son of Mont and a fifth-generation Plott breeder, is quoted as having said that "People would ride in here on mule with a tow sack and go home with a pup. They'd come from miles away to get one of those brindle dogs. People had to have them to keep their farms safe from wild animals." Many of those dogs were bred to other hounds, with performance on the hunt the only criteria considered. But the bloodlines of the Plott family dogs are said to have been kept intact. They were a family pack and the pride of ownership, the pride of training and the love of hunting kept the line going. Although their popularity grew locally, they were little known outside the Carolina mountains.

By the late 1800s the Plott hounds' reputation had spread across the State line

into the mountains of North Georgia, reaching the ears of one Elijah Crow of Rabun Gap. A bear hunter of considerable reputation himself, Crow had a pack of bear dogs he considered second to none. They were known as leopard spotted bear dogs, or leopard spotted curs, a breed recognized by hunters in the southern Appalachians at the time, but which has since disappeared.

Crow was so intrigued by the stories of the Plott hounds that he packed up his own dogs and gear and traveled to Plott valley to meet the Plott family and see for himself what the Plott dogs could do. Mont Plott welcomed Crow and the two became immediate friends. For several weeks they hunted their dogs — as separate packs and together, noting their performance. Each man was impressed with the other's dogs.

When Crow returned to north Georgia, he took with him one of Plott's old stud dogs, to which he mated one of his best bitches. The following year he returned to Plott valley bearing with him a pup, the result of the crossing of the Plott and leopard spotted cur hounds. That dog, named Old Thunderer, became an excellent bear dog and was subsequently used as a stud dog by Mont Plott. That outcross was the first admitted introduction of new blood to the Plott dogs since Johannes settled in Carolina in 1750. Another outcross to a dog having leopard spotted cur blood is said to have been made by Mont's son John and grandson "Little George" in 1928.

Mont Plott had five sons, three of whom (John, Sam and Vaughn) carried the traditions of hunting bears and breeding Plott dogs into the 20th century. John and Vaughn kept separate packs, which became known for their individual traits. John and his son "Little George"

maintained a short-eared strain of Plotts, said to be much like their ancestors. Known for their speed, feist and willingness to mix-it-up with bear and boar, they were generally more efficient and evasive fighters and for that reason were preferred by many bear and boar hunters. Vaughn, or "Von" as he was universally known, bred a longer-eared strain that had a colder nose and a better voice. Gola Ferguson, a friend and hunting companion of the Plott brothers, had a first-class pack of Plott hounds of moderate earage, which he developed by breeding his Plotts to a Blevins hound.

The Blevins hound was a brindle-colored dog with a black saddle that took its name from a Yancey County family. All evidence indicates that the base stock of the Blevins hound was Plott. In the late 1800s a patriarch of the Blevins family obtained some hunting stock from Mont Plott and during the next two decades returned to Plott valley for additional stock. Outcrosses the Blevins's made to hound stock — probably black and tan but possibly other breeds, no one knows for sure — produced a top-notch bear dog that was known for its keen nose and melodious voice. From these hounds the Blevins family assembled one of the finest packs of bear dogs in existence and they became known as the Blevins hound.

The cross of Gola Ferguson's Plott hounds with a Blevins in the 1920s produced a blend that was deadly on bear and wild boar. Two of Ferguson's dogs named Boss and Tige — the result of the Blevins cross — became noted throughout the Smokeys for their outstanding qualities. Both were extremely good trackers, had excellent mouths, were fast trailers and "ran to catch a bear" — the ultimate compliment a bear hunter bestows upon a dog. They were long-staying fighters and both were excellent tree dogs. Students of Plott hounds breeding say that the Plott-Blevins cross made by Gola Ferguson is partially responsible for the sensational dog that exists today. Of the 81 dogs initially registered by the UKC, 79 can be traced to one or both of these famous Plott hounds.

Between 1908 and 1912 a group of northeastern and European businessmen attempted to establish a European-type shooting preserve on Hooper's Bald in the remote mountains of Graham County along the N.C. – Tennessee line. They enclosed several thousand acres with rail and wire fences and stocked elk, buffalo, Russian brown bear, ring-necked pheasant and European wild boar and other exotic game animals. Long before the enterprise was abandoned, the wild boar had escaped and were well on their way toward establishing themselves in the surrounding mountains. Equipped with 3-to-4 inch tusks and the quickness of a deer, the boar was a formidable adversary for hunters and hounds. The bear-fighting Plott hounds were found to be adept at trailing and holding wild boar as well.

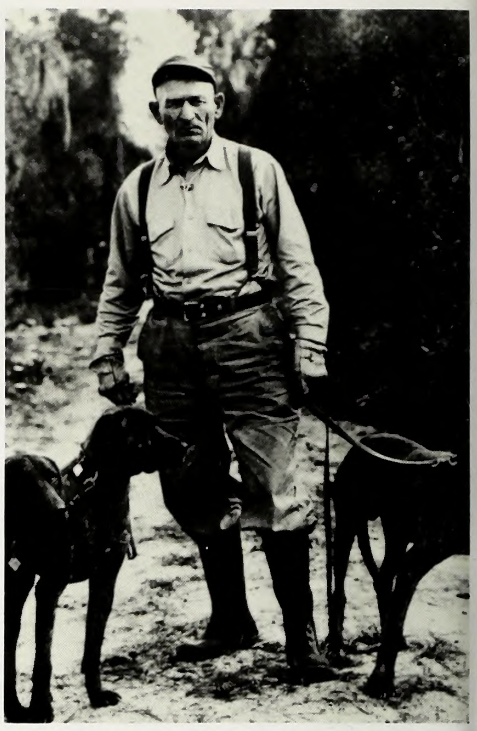
By the 1920s and '30s the Plott hounds were becoming better known outside the area. In addition to the Plott families and Gola Ferguson, the Cable family of Swain County had a first-rate pack, as did the Phillips of Graham and Clay counties. In the early '30s *Life* magazine ran an article on the Plott hounds, which sparked interest in the breed. It was at about that same time that bear-boar hunts began being staged in western North Carolina and east Tennessee which gave a large number of hunters from around the country first-hand knowledge of the dogs.

During the 1930s efforts were begun to have the Plott hounds recognized as a separate breed, and in 1946 the United Kennel Club granted this recognition and established standards for the breed.

The originators of the breed never dreamed that their hounds would attain the fame they now have among hound men, nor did they envision that the Plott would become a premiere raccoon hound. "Fact was, back when I was hunting with Gola Ferguson and them, if a Plott cropped that would run a coon when a bear track was available, they'd get rid of him right quick," said Taylor Crockett.

It is sheer numbers that have brought about the shift. Big game hunting — for bear, boar, and mountain lion — is a rather specialized sport for which the Plott is recognized as the premiere hound in most quarters, but by comparison there is a rather limited number of areas across the country where that type of hunting is done. The ranks of raccoon hunters, on the other hand, are legion and they create quite a demand for good raccoon dogs. Just as the Plott filled the bill when a big game hound was needed, the breed is meeting the challenge for first-rate raccoon hounds.

The modern Plott is generally a darker-colored dog than the original stock of Johannes Plott. Two of his dogs were buckskins, a color not allowed by present day registration standards. They have a better nose, a more melodious voice and a more hound-like appearance than the original Plotts. Most houndsmen consider these changes improvements that make the dogs more versatile, more applicable to most of today's hunting situations. And,



the change in emphasis from a dog that will fight a bear to one that trees raccoons may also have altered the temperament of many Plotts, possibly for the better. Though he is by nature gentle and easy-going with people and other dogs, the Plott will fight to the death when turned upon, which has given it a bad reputation with some dog owners. "Some people's objection to the Plott is that they're a little bit hard to handle," says Crockett, "and they are if you don't know how to handle them. You have to keep them apart or

The old breeders never dreamed that their hounds would attain the fame they now have.

In photo above, "Little George" Plott (left) and two unidentified men hold part of the family pack about 1938. Controlled hunts of bear and boar began to be held in the 1930s, and the Plott hounds' reputation grew as out-of-staters came into contact with them. "Little George" worked with his father and uncles to get the breed recognized. Vaughn (Von) Plott stands with Plott's Happy, Plott's Balsam, and Plott's Link in 1954 (above left). John Plott holds a hound with the leopard-spotted-cur coloration (left). Sixth-generation descendant of Johannes Plott, Lawrence Plott of Waynesville (below) still maintains the family tradition of raising Plott hounds.

they'll fight amongst themselves. I've lost more dogs, had them kill each other, than I have lost to game."

The Plott hound is the oldest American-bred hunting dog breed. Although the black and tan and redbone breeds were registered earlier, they don't go back nearly as far as Plotts. And, as has been mentioned earlier, the Plott hound ancestry is different. Though other breeds have been crossed fairly recently with the Plott dogs to produce the Plott hound we know today, that crossbreeding was made on an already established strain or breed that bore little resemblance to the foxhound that gave us our other hounds. That ancestry has produced a hunting dog with a difference.

What is that difference? Taylor Crockett says "It's generally his aggressive nature. A Plott that pans out like he's supposed to is fast on the track, he's gritty, he's got lots of what I call go-power — enthusiasm; lots of desire and heart."

Add to that a word that keeps cropping up whenever a conversation turns to Plotts — courage. A Plott will not quit a fight. Even though maimed by the crushing slap of a big bear or torn by raking claws or gnashing teeth, the Plott will attack again — and again until he is either hauled off by the hunters or finished by the bear. It is that "grit" that endears the breed to a growing number of houndsmen.

By Mark Taylor

It's All In The Flow

Water runs downhill, and everyone wants some of it as it goes by. But what happens if there isn't enough to go around?

I like to paddle the Haw River in the heat of mid-summer. This is not the big, brawling river of early spring so eagerly sought by skilled kayakers who surf in standing waves at rapids like Gabriel's Bend. The summer Haw is subdued. The rock gardens are burbling shallows which seldom contain a clear channel. Gravel bars stretch nearly bank to bank. Sunfish cluster in still pools, easy prey for the ultralight spinning rod that passes the Dog Days lashed to the gunwale of my canoe.

My companion on these trips paddles a kayak, and our sporadic conversation is usually limited to river talk. The water — or lack of it — in the channel is discussed, and how this will affect the character and "runability" of upcoming rapids. Guiding a canoe through the rapids of the summer Haw is often a lesson in intricate geometry. It's a simple task, however, compared to charting a future course for our rivers past the obstacles of conflicting needs, uses and desires imposed by a rapidly growing State.

There was a time when the amount of water in a river was influenced only by how much time had passed since that last rainstorm. Nowadays, this is not always the case. Of course, storms still affect water levels, but development in upstream basins, irrigation needs for agriculture, and even the relative price of Arab crude oil all play a role in whether my canoe slips through a chute or hangs up on the rocks, or whether fish and other aquatic life live or die. From chamber of commerce leaders to farmers, everyone wants a piece of our rivers. So do canoeists and fishermen, the difference being that we'd like our piece of river left in the river. How do we meet the needs of these often-competing interests.

It's a difficult question, and one that is being addressed by a group of biologists and engineers who form North Carolina's in-stream-flow committee, an uninspiring name for a team of individuals who are quietly doing work that may have a profound impact on the future of our State. In essence, the team develops recommendations on a case-by-case basis on how much water may be withdrawn from a stream — or re-

leased from a reservoir — while maintaining environmental quality and ensuring that downstream users have adequate supplies of water.

"Major projects on several rivers prompted us to begin taking a good hard look at instream flows in the early 1970s," said John Wray, deputy director of the State Office of Water Resources, which furnishes most of the technical expertise for instream-flow work. "In one case, the proposed withdrawal for the Shearon Harris nuclear plant would have created unnatural low-flow conditions down river. This would have reduced water quality, fish habitat, recreation, and could have affected navigation.

illustration by David Williams

NRCD

Also, it may have increased the upstream movement of saltwater in the lower Cape Fear River during drought conditions. Another withdrawal for a proposed nuclear plant on the South River near Bladen and Sampson counties would have severely depleted flows downstream affecting farmers who needed water for irrigation, reducing fish habitat, and affecting other uses. These projects, and others, showed that instream flows needed to be considered."

One member of the instream-flow committee is Scott Van Horn, a research fisheries biologist for the Wildlife Commission. Scott lives in Durham, and his interest in rivers goes beyond the professional. He introduced me to the fine Roanoke bass fishing found in the nearby Eno River, and his role is to see that this fishing is not lost to future development.

"Withdrawals can affect streams in three critical ways: by changing water depths, reducing the amount of stream bottom that is under water, and lowering the velocity of flows. All of these factors can influence fish populations."

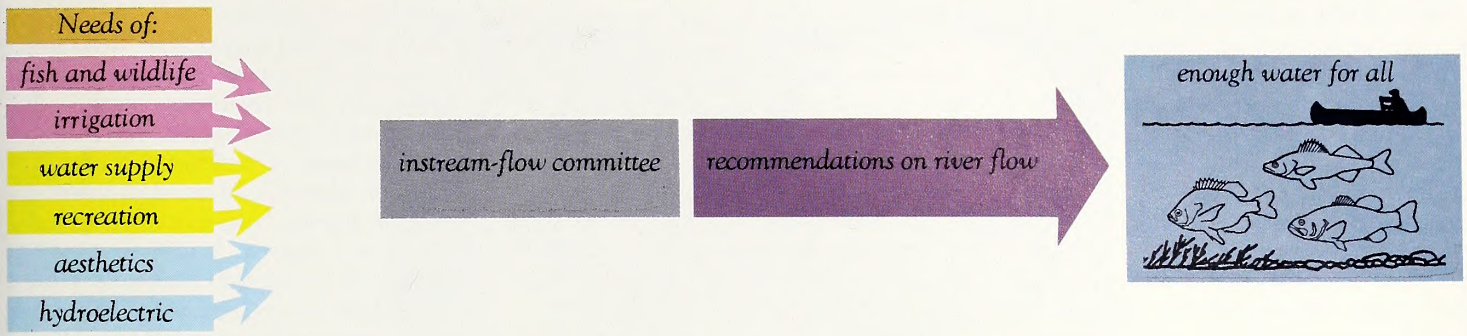
Van Horn points out that the redbreast sunfish, for example, only spawns on clean gravel beds and needs a minimum of one foot of water for spawning. A large withdrawal from a stream may hurt redbreast sunfish populations by lowering stream depths over spawning beds below one foot, or leaving gravel beds on the river bottom high and dry. This reduces available spawning sites, and may reduce stream velocities to the point where silt settles out on fish eggs and suffocates them. Since different species have different needs, the system gets complicated.

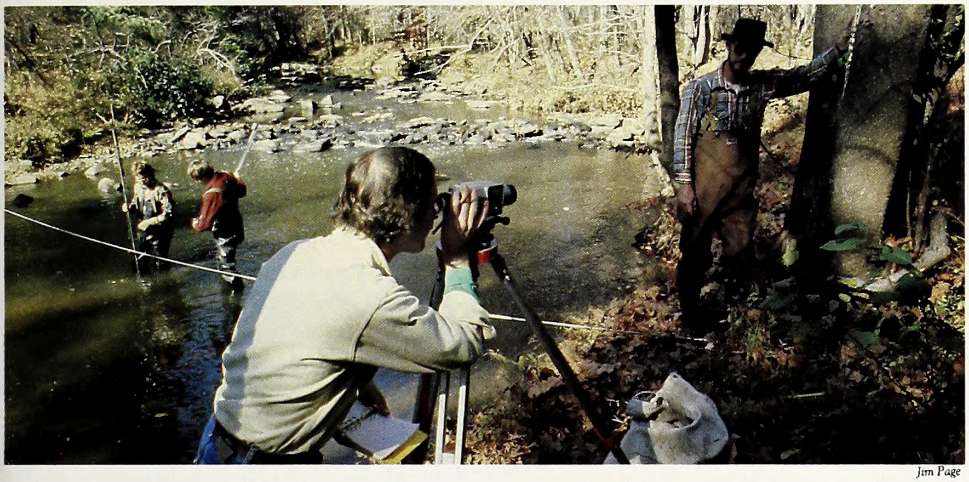
"We've colected data on flow rates, stream profiles and bottom composition for several major rivers in North Carolina, and we plug this information into computer models to see how withdrawals at different levels will affect fish populations in a stream," said Van Horn. "Essentially, this computer program allows us to look at a stream from a three-dimensional point of view. For example, we can see how much spawning habitat will be lost for a species if the stream is drawn down to a certain level. And spawning is not the only critical factor. Riffle areas, for example, are shallow and fast and teem with aquatic life. These areas are crucial to fish populations, and the computer program allows us to see if a proposed withdrawal would eliminate a riffle."

Exotic computer models may seem far removed from streamside biology, but they have already played a role in protecting fish populations. In fact, Van Horn and others have applied these principles on the Eno River in Durham. In 1981, the City of Durham planned to place a pipe in the Eno between West Point on the Eno Park and the old Oxford Bridge. When Lake Michie, the city water supply on the Flat River, was low, the city would supplement its water supply by taking water from the Eno and pumping it to Lake Michie.

"Initially, we had problems with this. Water would have been pumped from the Eno during times of drought when the river was already low. The proposed withdrawal would have drawn the river down to a mere trickle, and fish populations would have been hurt. Eventually, we worked out an agreement with the City that guaranteed adequate instream flows during the spawning seasons and in mid-summer when drought is usually most critical. In this case, as in most, fish populations were protected and the city got the water it needed."

The city was also satisfied with the arrangement. "The compromise on the Eno River was reasonable," said Terry Rolan, director of the City of Durham Department of Water Resources. "Maintaining adequate instream flows for wildlife and fisheries on the Eno and other rivers is certainly a valid use of our water. Also, maintaining instream flows ensures that downstream municipalities, industries, farmers and other users have adequate water. Durham sits near the head of the Cape Fear and Neuse River watersheds, which is a blessing and a curse. We have an adequate supply of clean water, but the quality is limited. I feel that one of the most important steps in wa-





Jim Page

Jim Page

Scenic Stairway Falls is one of four falls threatened by a proposed hydroelectric plant on the Horsepasture River in Transylvania County. The hydro project may be a test case in determining the importance of "aesthetic" values in setting water levels. Biologists can protect fish habitat by collecting data (left) and using computers to recommend adequate water levels through the year. But what's adequate for fish may not prevent these waterfalls from slowing to a trickle. As the illustration above shows, determining a minimum water level for a river means balancing a number of competing interests, including "aesthetic" interests.

ter management in North Carolina in the future will be to ensure that we have adequate storage reservoirs for water. With proper management, releases from these reservoirs could be tailored to meet a wide variety of instream uses. For example, releases could be timed to offer optimum spawning conditions for game fish, maintain adequate flows for fish and wildlife in times of drought, or to enhance whitewater sports on weekends when the demand is greatest."

Bynum is a small town in Chatham County about five miles above Lake Jordan, a popular "put-in" spot for canoeists running the Haw River. At the heart of the town lies an old dam, and on the east side of the river a canal runs from the dam through a series of old mills before entering the Haw a few hundred feet below. Along the course of the canal is an old powerhouse containing a hydro-electric generator which has been used off and on for the past half century. Not long ago, small hydros like this seemed to be going the way of the village blacksmith shop. However, the surge in oil prices which began during the Arab Oil Embargo in 1973, coupled with generous tax incentives offered by the federal government to encourage development of alternative energy sources, has brought the Bynum hydro and many others back to life.

"In the past few years, we've received applications for over 60 potential hydroelectric generating sites, mostly on rivers in the Piedmont and Mountains," said Don Baker, an aquatic habitat specialist with the Wildlife Commission's Habitat Conervation Section. This section assesses the impact of hydros and other projects on wildlife and fishery resources. "Two rivers, the South Fork of the Catawba in the Mountains and the Deep River in the Piedmont, have applications pending for seven hydros each. Depending on how they are designed and operated, these projects can have a substantial impact on instream flows."

The proposed hydro at Bynum is a good example of a "run-of-river" hydro that has a minimal impact on the environment. Since the dam, canal and powerhouse already exist, no new structures will be added and flows in the river will remain unchanged. When the river is up, power will be generated. When it is down, the generator will lie idle.

"One of the biggest concerns with hydros is the alteration of flows in the river," said Baker. "Run-of-river hydros like the one at Bynum pose few problems because flows remain the same. Most of these sites are abandoned hydros which are being refitted. Our main concern at these facilities is that adequate flows be maintained downstream in times of drought. Also, if portions of the river are going to be by-passed by diverting the water through a hydro, adequate flows must be left in the bypassed section to maintain healthy populations of aquatic life."

Hydros which produce "peak power" are another story. At these facilities, water is stored behind a dam when the generator is not running. When demand for power peaks — typically in the early evening — a rush of water is released and the peak power, fetching the top price, is sold to utilities.

"Production of peak power can cause problems for fisheries," said Baker. "First, rivers are often very low during the day when water is being stored. Then, when power is generated, a rush of water is released. This scours the riverbed, and makes it very difficult for fish and other aquatic organisms to maintain their normal patterns of life. It's a feast or famine situation."

Perhaps nowhere is this situation better

illustrated than at a hydro owned by Carolina Power and Light Company on the Yadkin River at the base of Lake Tillery. Under the terms of an existing agreement, CP&L is legally obligated to release only 40 cubic feet of water per second from the facility. When water is being stored to generate peak power, the river below the dam — ordinarily hundreds of feet wide — is nothing more than a series of shallow pools separated by gravel bars.

"Even when no water is being released at this hydro, the seepage through the dam equals or exceeds 40 cublic feet per second," said Van Horn. "Basically, there's no river at all when water is being stored to generate power. Then, a huge head of water is released during the peak period which alters the stability of river banks, scours spawning beds, and so on. These gross fluctuations in water levels not only cause difficulties for aquatic life, but also make it hard for fishermen and anyone else to enjoy the river. Instream flow needs aren't confined to fish populations — everyone who enjoys using a river has a stake in these issues."

The Horsepasture River is a small, clear stream which tumbles through a deep granite gorge in Transylvania County. In less than a mile, four waterfalls — Drift, Rainbow, Stairway and Windy Falls — cascade through the gorge. The falls are well-known; they are listed on the official North Carolina State Highway Map, and are also featured on postcards sold at nearby country stores and gift shops. Hikers visit the gorge, and swimmers and tubers play in the falls. Fishermen are few — it's a long walk in over Forest Service or paper company land — but the brown trout fishing is good, and the scenery is spectacular. Those who know the gorge, love it.

Yet, all is not well on the Horsepasture River. Indeed, it may become a test case for minimum instream-flow needs in North Carolina.

In 1981, Carrasan Power Company applied for a permit to study the feasibility of constructing a hydroelectric plant on the Horsepasture River. Water would be removed at the top of the gorge, piped to a generator, and would ultimately be released back into the river 2½ miles downstream. The company claimed that leaving a flow of 15 cubic feet per second in the river would maintain the brown trout fishery, and preserve the aesthetics of the gorge and the waterfalls. After conducting an extensive study, the Department of Natural Resources and Community Development and the Wildlife Resources Commission disagreed.

In a report to the N.C. Department of Natural Resources and Community Development, fisheries and aquatic biologists from the Wildlife Commission and the Office of Water Resources recommended that a minimum flow of 40 cubic feet per second — almost three times the flow proposed by the power company — would be needed to maintain fisheries. This would ensure "survival" conditions for brown trout, and would still not maintain optional conditions for spawning.

Yet, fisheries was only one consideration. The question everyone was asking was what would happen to those four beautiful waterfalls if the application was approved?

"The initial proposal would have just about dried up the falls on the Horsepasture River," said Alan Eakes, a member of the instream-flow committee. "At 15 cubic feet per second, these falls would have been drawn down to a mere trickle. The loss of spray, the roar of falling water — everything that makes the falls spectacular would have been gone."

Eakes' role on the committee is to provide input on recreation and aesthetics. Unlike the other members, he is neither a biologist nor an engineer. By trade he is a landscape architect, and works for the N.C. Division of Parks and Recreation. He sees the Horsepasture River as a test case, because the strongest objections to the project are based on aesthetics.

"Recreation and aesthetics do have an economic value which is often quite high, but can't be measured easily in terms of production — like the value of the power produced by a hydro at a certain flow. However, the Horsepasture gorge is well-used by hikers, swimmers, tubers, nature lovers, fishermen and other recreationists. Because of the natural setting, the 'quality' of this recreation is high. If the falls were drawn down to a point where they were not attractive, a very significant use of this river would be lost."

Most of the members of the instream-flow committee deal with factors that can be measured quantitatively. Eakes generally does not. Van Horn determines at what level fish can survive as a population. Eakes tries to determine when the pleasure of fishing disappears, or when a river drops to the point where it's no longer pleasant to take a nature walk up its banks.

"There's a real difference between the water levels needed to support fisheries and aquatic life, and the water levels needed to maintain aesthetics and recreational values," he said. "To use one example, the low flows which will still support fish populations do not provide good fishing — it's no fun to fish in the midst of a prolonged drought. The same principle applies to swimming, canoeing, bird-watching, and a host of other activities. When withdrawals lower a stream to the point where these aesthetic factors no longer exist, a significant use of the river is gone."

Eakes feels that higher flows need to be maintained on rivers with outstanding scenic, natural and recreational value. On these rivers, he feels that the "target flows" should be based on a seasonal modal-flow system. In layman's terms, this system assesses the average flows in a river throughout the four seasons. Withdrawals would not draw the river down below the expected average flow in each season. The result would be flows that most people would consider natural. He recognizes that this is controversial, and could not apply to all rivers. However, for rivers with outstanding aesthetic or recreational values — for example, rivers which are included in the State system of natural and scenic rivers or those which are heavily used for recreation — this system should be considered. In fact, a study of the aesthetic and recreational values of the State's rivers is under way.

Water. We've always considered it an unlimited resource here in the East. But, like timber, land, soil and other natural resources, water can run out.

I never thought much about water until I helped my uncle fix a flume on his irrigation ditch in the Rocky Mountains of Colorado. At almost 12,000 feet we parked the truck at the head of a jeep road and panted and struggled the last few hundred yards uphill to the flume, laboring under our heavy loads of tools, nails and timber.

Chiseled into stone near the wooden flume were the initials of my grandfather, carved well before the turn of the century. I marveled at his determination, digging this broad ditch with hand tools, a team of horses, and the help of a few hired hands from the top of this inaccessible mountain several miles downstream to his ranch. The water was hard-won, but was his — and now ours — by right. He was free to use as much as he could divert. For almost a century, his efforts had transformed arid sagebrush to rich pasture to sleek Herefords to steak dinners.

Below the flume, Willow Creek runs to the Roaring Fork River which eventually drains into the Colorado River system. At each point downstream, other farmers, ranchers, miners and cities siphon off the water that is legally theirs. Finally exhausted by this use, the mighty Colorado River — the cutting edge that shaped the Grand Canyon — dies in a trickle of silt and salt on a desert flat in Mexico. An instream-flow program — mandated by law — would restrict some uses of water, but it would keep our rivers healthy, and would guarantee that everyone gets his fair share.⊠

All photographs courtesy of Charlotte Hilton Green

For three generations of bird lovers, writer Charlotte Hilton Green has been North Carolina's

First Lady of Birds

Interview by Lawrence S. Earley

At 95, Charlotte Hilton Green would be excused if she were slowing down a bit. But on a hot day in July, she was up and about in Raleigh, her adopted home of 63 years, packing boxes and getting ready to move out of her house. It was typical of a life full of vigor, high purpose and great achievement.

One of the first in North Carolina to enlist under the banners of conservation, Mrs. Green was a prime mover and shaker on behalf of the environment and, especially, of the birds which were her great love. She was born in New York state in the late years of the last century. She recalls that Carrie Nation, the great temperance preacher, once visited her seventh grade classroom and pledged the children to temperance. She was influenced early by the conservationists who were connected to Cornell University and when she moved to North Carolina in 1920 she brought their ideal of nature study down with her. Its beacon has been unwavering since. She has fought for many issues, from soil conservation to the preservation of Raleigh's Umstead Park.

Mrs. Green has been a popular speaker for many years, but she's best known for her writing. She began her widely read column "Out of Doors in Carolina" in the News and Observer in 1932 and for more than 40 years she commented on nature, birds, the Carolina Bird Club (which she founded with seven others in 1936), and environmental issues. In 1933, she collected some of her newspaper columns into her first book, Birds of the South. *This was followed in 1939 by* Trees of the South. *More recently she contributed many articles to* Wildlife In North Carolina.

An intrepid traveler, Mrs. Green has been all over North Carolina and to many parts of the United States pursuing her love of the out of doors. She has also sought adventure in surprising and exotic locales — in the Galapagos Islands, following the footsteps of Charles Darwin; in the Arctic Circle, camping out on the frozen tundra. One night she found herself locked up in a museum in Budapest, Hungary. When she was 83 she toured Yugoslavia; later she visited South America.

In the midst of packing many years of memorabilia, Charlotte Hilton Green greeted friends and neighbors as they came in to help. "Now I don't know what you can do," she said. She put up with a faulty tape recorder to speak with Wildlife In North Carolina *about her life and work.*

My husband and I came to North Carolina in January of 1920. When we first came out in 1923 to build a little house on White Oak Road in Raleigh, we were in the wild woods. And the children would come right in the yard with their guns shooting birds. Nobody said anything about it. "Who cares about birds?" they said.

I figured if you could get their parents interested, the children would become interested. You didn't reach too many, you know, but I think my column in the News and Observer, "Out of Doors in Carolina," reached the most in the beginning. Then the bird club movement started and small towns became bird sanctuaries — they were very proud of having a sign that read "Bird Sanctuary." And people began doing more in school.

And we did get a good conservation movement started in North Carolina.

I was interested in nature long before I came down here. Around 1910 or so I started teaching in a one-room country school where I had 57 children in 8 grades. But not all at one time. This was cold country, in the hills of western New York. Cornell University had published a series of rural school leaflets. Every rural school teacher was supposed to send in the name and number of her students. And she would be sent some of these leaflets.

That encouraged some bird club work in the schools. We started first with "Learn A Bird A Week." We tried to tell everything about a bird, tell what family it belonged to, what type it was, what its mate looked like and how many eggs it laid in what kind of nest, where it spent the winter and what they did. Well, the children loved it.

We also used Chester Reed's little handbook, *Guide To Landbirds East of the Rockies*. It was published in 1906 and the paperback cost $.75 — that was all I could afford. I wore out three copies of that book. Roger Tory Peterson started with Reed's book. Everybody started with it. The children were so thrilled with their books that they asked to take them home overnight and show them to their parents. And I had a little boy, his mother was a Dutch woman who didn't speak very good English, a widow, trying to struggle a living with her child and herself on a worn-out farm. She would take in fine washing for some of her customers. She called me one day and said, "You bring me book like that, I pay you later. Me and Hans, we learn the birds together."

Dr. Anna Botsford Comstock, standing by her husband, was called the "Mother of the Nature Study Movement." Through her classes at Cornell University, she influenced young teachers, including Charlotte Hilton Green, to use nature to increase the student's "joy of living."

See the children didn't have anything — no TV, not even radio. I tried hard to get some of them interested, stay on and then go to high school the next year, finish out the year, but I couldn't get the parents interested much. "He's got more education than I had," they'd say. "We can't afford it, it's our living." Finally I protested too much and a woman said, "Well you ain't so smart; I got me a man and you ain't." I was 19 or 20 at the time. It put me in my place. Nobody could do that very often!

Through work that I had done with schools I got a grant from Grange No. 1 in Fredonia, New York, and went to summer school at the Chatauqua Institute. That first year Cornell was starting an experiment with having somebody hold a series of classes at Cornell to encourage students in agriculture to come. Dr. Pearson was head of the thing and Dr. Ruby Green Smith, a woman who was to become my sister-in-law, gave a course in bird study, nature study. I met my husband there.

The nature study movement started at Cornell University early in the century. My husband's family was tied up with it. Dr. Anna Botsford Comstock was called the mother of the nature study movement. She wrote this big handbook of nature study. Her husband was head of the Entomology Department. My husband's sister lived with them and went to Cornell.

There were some outstanding people there. Liberty Hyde Bailey was one of the originators of the nature study idea along with Dr. Comstock. He was at Cornell. Dr. Arthur Allen was there. I had worked with him, but he was a very young man then. Louis Agassiz Fuertes, the great wildlife artist, was there.

The Fuertes were friends of my husband's family, and we were invited over one afternoon to his studio. When we went in he was quite excited — he had a letter in his hands. He said, "Look at what I've just received!" He had been invited with a group from the Chicago Field Museum to go to Ethiopia and make a study of their wildlife, especially the birds. And here was the letter which had just come, signed "Haile Selassie, heir to the throne of Ethiopia"!

Do you know about the Christmas Bird Count? Frank Chapman started that. He wrote *Handbook of the Birds of North America.* That was the first really technical book about birds. Anyway, the Christmas Bird Count started back around the turn of the century. Some sportsmen had an idea to form teams on Christmas Day and see who could get the biggest number of kills. Anything that was wild. Dr. Chapman got so upset that he suggested having a bird count, see how many birds you could count in one day. And they had 75 counts sent in from all over the country. Now they're held not only all over the country, but in many parts of the world. It's held sometime within a period of 15 days before or after Christmas, but before the beginning of the year. And the point is to see how many birds you could see, from midnight to midnight, in a radius of seven and a half miles, 15 miles either way. And they've become very popular.

Through my husband's family I met a lot of these famous people.

When my husband came down here on invitation to look at a job he was offered he accepted and came back and said, "You'll like Raleigh." It was a case of love at first sight.

I joined the Woman's Club early. The nature work didn't begin right then. It was the garden clubs that started the outdoor movement down here. The bird club movement was part of that, and the whole thing was part of the Woman's Club because the Woman's Club started the garden club. Some of those women in the garden clubs were already banding birds, which was very unusual. We had one of the few bird-banding stations in the State.

So many things started in the Woman's Club, the old one downtown. It was the

center for so many things.

I've been credited with helping start the bird movement in North Carolina, which I did. Now the first bird club we had in the State was started one December night in 1936. Raleigh had long had the old Raleigh Natural History Club. It met in the museum downtown and was headed by the famous Brimley brothers. We knew them from the beginning because when my husband came down he soon went into the Museum of Natural History and ran into one of the Brimley brothers who was then working on birds. He was a taxidermist. And my husband casually said, "Well, my wife is interested in birds." He said, "She is? Well tell her to come down, I'll take her around." And he gave him a copy of the first State bird book which he and his brother and Gilbert Pearson had written.

I had begun writing my column in 1932, but I had done other feature articles in general. Then in 1936 I started going to this natural history club and one December night there was a young minister named John Gray who had come from Virginia to the new Presbyterian Church and he had joined the Natural History Club. And one night he said, you know we ought to have a bird club here." He was a highly trained ornithologist himself. "Let's start one," he said. So we talked about it and they said, "Charlotte, you will be the president of the Raleigh Bird Club." I said, "No, John, you do it." He said, "No, I'm going to edit the bird bulletin. You belong to the Woman's Club, you know a lot of these people. What we'll do is call a state-wide meeting, people interested in birds come to Raleigh on a certain date in February." We did and we had it at the Woman's Club, had luncheon at a very low price. Seventy-five people joined from all over the State. That was the beginning. It became quite strong. We had outstanding meetings — we would have about three long weekend meetings a year in all parts. We went to the mountains and the coast. Later South Carolina joined and it became the Carolina Bird Club.

We had some wonderful trips with the Bird Club. One time we went to the Iona Swamp, I think it's called, in South Carolina. There is a certain Bachman's warbler which is very, very rare. In fact it was supposed to have disappeared at one time. On one of our trips to South Carolina it had been spotted, and so a group was going in to the swamp. To be able to go in there I had somebody's boots and somebody's overcoat and somebody's big raincoat. I looked like two rain barrels. Well, we did get in and we saw Bachman's warbler.

When Roger Tory Peterson was here we were eating breakfast and I said something about Bachman's warbler and he said, "Where did you ever see a Bachman's warbler?" He had never seen one at that time. That was one time I was ahead of Roger.

Writing didn't come easy to me. It was hard work, hard research. Some people say, "I just sit down at the typewriter and write, why do you make such hard work out of it?" It *is* hard work. I used to keep a notebook always underneath my pillow. Sometimes you get an idea at night and you think, "I'll remember in the morning," but you don't. You try your hardest and you cannot recall. It's just a word or two. You need to get it down.

Recently, Mrs. Green received the Conservation Communications Award from the N.C. Wildlife Federation and the National Wildlife Federation.

What's hard is finding the human interest angle. You must always find that human interest point. There had been a bird column before mine in the newspaper, but the editor told me it didn't get much response. I said, I know why; it was excellent for anyone who knew anything about birds, but it needed human interest and it was too scientific and technical. They're not ready for that. That's what Frank Smithers of the News and Observer told me, "Be accurate as far as you go but for God's sake don't get too technical. Our John Farmer just can't take it."

I think all writers want to feel that they've reached a few people. One of the most interesting letters I received was hand-written, misspelled. This woman had been a mill worker, used to having people around. She married an eastern tenant farmer and she found life pretty lonely. And she tried to explain some of that in a letter. She said, "Miss Jennie McKim — Dr. Jane McKimmon was North Carolina's first home demonstration agent — got my old man to cut a window over the kitchen table; you cut a window in my soul. Before I begin reading what you writ I never know'd a redbird's mate looks different. I never know'd a pine tree had a flower. I got me a yard with some flowers and ferns and at night I like to go out and look at the stars. Somehow life ain't so lonely any more."

I'm disappointed in that there's no longer an Audubon Junior Club. Eleven million children went through the Audubon Junior Club. That's where Roger Tory Peterson got started. He was from my home county. I didn't know him then because I'm older, but I knew him very well much later.

Children are too glued to their TV today. They are not getting out of doors now; they are not learning about the out of doors. I think parents themselves ought to be more interested.

The study of nature opens up a whole new way of life. There's always something of interest. Everywhere you go there's something to see — what birds can I see? What trees? What wildlife? How are they living, what are they doing to the soil? What are they doing to the farming?

I remember a friend of my husband's telling me about being in France one time and they visited an old man. A simple little farm had been in the same family since the 8th century, and yet it was in good condition. I don't know whether the old man knew anything about conservation, but he knew how to treat the land. He leaned down and picked up a handful of dirt, and said, "See, this I hold in my hand is France." He knew that the soil was sacred.

Carolina Profile *is a periodic feature in* Wildlife in North Carolina. *In these interviews, men and women reflect on their outdoor experiences and on what the land and its resources mean to them.*

written by Jane Rohling

North Carolina's Museum of Natural History

Once little more than a musty collection of stuffed animals, the North Carolina State Museum of Natural History has a new look and bold plans.

Ken Taylor

From its mountain habitat display (facing page), a bobcat surveys the visitors that enter the N.C. Museum of Natural History in Raleigh. Partners in the Museum's progress, Dr. John Funderburg (right), Director of the Museum, and Dan Lyons, Curator of Exhibits, discuss new exhibits in front of the Brimley Brothers' display.

If I had to trace my interest in wildlife back to its roots, I'd probably find it sprouting among the exhibits in the Field Museum of Chicago. The Field Museum of Natural History is one of the nation's great natural history museums, and as a child I wandered for hours through its acres of halls, marveling at everything from mummies to mastodons. The wonders they contained left an enduring impression on my young mind.

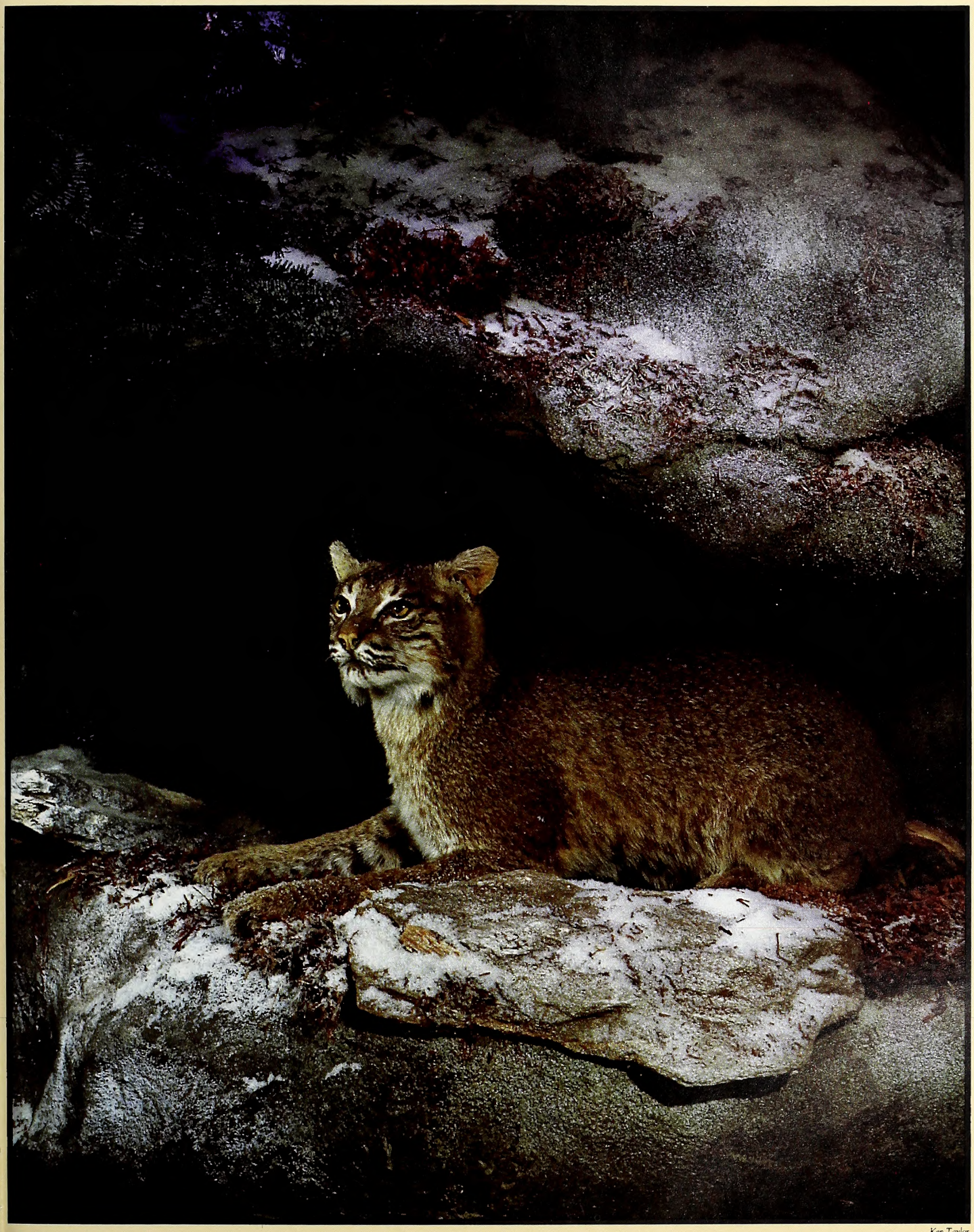
There are a lot of young minds — and not-so-young minds — that are being impressed these days by the North Carolina State Museum of Natural History in Raleigh. For over 100 years, the museum has been involved in studying the natural history of the State and adding to its collections of animals, rocks and minerals of the southeastern United States. In addition, it is reaching out to the public through its newly designed exhibits, its publications and its public education programs.

But the Museum hasn't always been the bright, dynamic facility it is today. For years, the collections were shuffled from one building to another, always cramped in a spare room here or there, never with a big enough staff or budget to be maintained properly.

Finally, in the 1970s the Museum began to get the attention it deserved. After the American Association of Museums refused to accredit the North Carolina facility in 1969, Commissioner of Agriculture James A. Graham decided it was time for the Museum to take on a new look. In 1974, Dr. John R. Funderburg was hired as the Museum's fourth director and given the job of raising the Museum up to — and above — accreditations standards.

"This was one of the finest museums in the country until the 1930s or '40s," Dr. Funderburg told me, "Then it fell on some hard times. I want it back up where it was."

Since Funderburg's arrival, the Museum has been in a state of constant renovation. With generous financial assistance from the General Assembly and the approval of the Department of Agriculture, which administers the Museum, the Museum's staff in Raleigh has grown from 11 to 22, and the building has been modernized with major structural and mechanical improvements. The bright, modern look of the Museum's many new exhibits is complemented by dynamic new educational programs that have brought it national recognition.



Ken Taylor

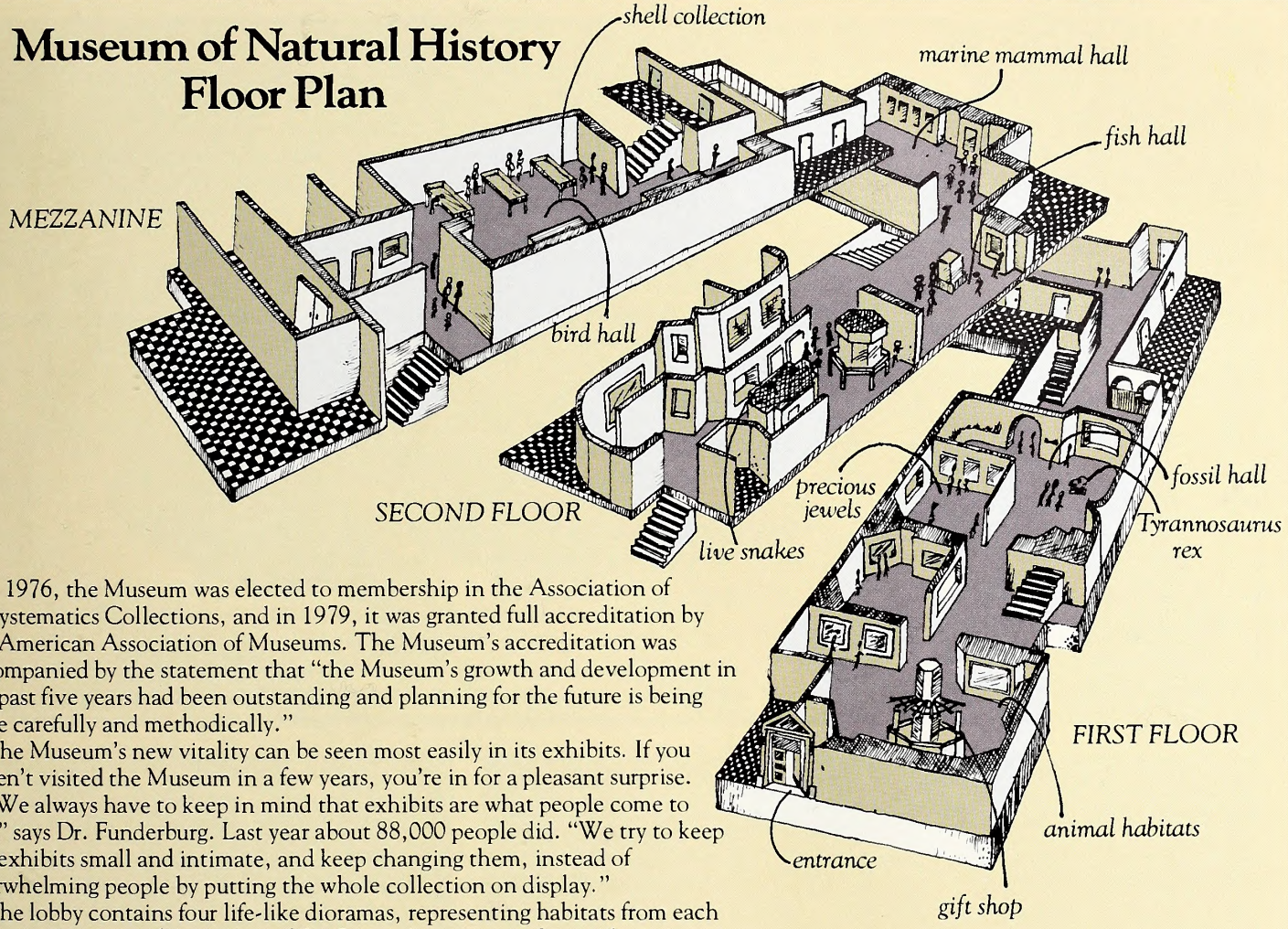
Ken Taylor

Ken Taylor

Extinct creatures from different eras, the Tyrannosaurus rex *and the passenger pigeon both have exhibits at the Museum. Exhibits brought 88,000 visitors to the Museum last year, and new displays are being added all the time. Visitors can tour the State by looking at four meticulously crafted natural habitats and their creatures. Collections of bird and mammal specimens are popular and so are the fossils in the Fossil Hall. Visitors can step back in time when they gaze at the Brimley Room (below), a reconstruction of the Brimley's work room in 1925.*

Ken Taylor

Museum of Natural History Floor Plan



In 1976, the Museum was elected to membership in the Association of Systematics Collections, and in 1979, it was granted full accreditation by the American Association of Museums. The Museum's accreditation was accompanied by the statement that "the Museum's growth and development in the past five years had been outstanding and planning for the future is being done carefully and methodically."

The Museum's new vitality can be seen most easily in its exhibits. If you haven't visited the Museum in a few years, you're in for a pleasant surprise.

"We always have to keep in mind that exhibits are what people come to see," says Dr. Funderburg. Last year about 88,000 people did. "We try to keep the exhibits small and intimate, and keep changing them, instead of overwhelming people by putting the whole collection on display."

The lobby contains four life-like dioramas, representing habitats from each of the major geographic regions of the State. An oystercatcher wades in a coastal salt marsh, a white ibis stalks its prey among cypress knees, pink ladies slippers and a luna moth decorate a lush woodland stream bank, and bobcats peer at you from snow-covered mountain ledges.

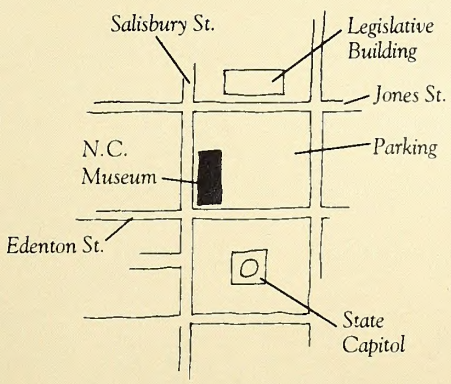
As you proceed through the first floor exhibits, you'll be introduced to the geology of North Carolina. You can feel your way along the walls of a dark mine shaft filled with flowing gemstones, then enter the mysterious world of cave creatures, complete with stalagmites and stalactities.

You'll emerge from the darkness of the cave into the warm yellow glow of the fossil exhibit, where you can run your fingers over the skull of Tyrannosaurus rex, the fiercest predator that ever lived. Delicately painted wall murals take you back to an era when ferns were as big as trees and dinosaurs ruled the earth.

The Brimley Exhibit is the next stop. It is dedicated to H.H. and C.S. Brimley, brothers and naturalists who served the Museum as researchers, collectors and taxidermists from 1882 until their deaths in 1946. H.H. was the Museum's first full-time employee — making him both curator and janitor. He later became the first director. At a time when most museums displayed stiffly posed specimens in cluttered glass cases, H.H. was noted for his innovative concept of displaying animals in natural settings, with different kinds of birds or mammals grouped in habitats where they would normally occur. The exhibit features several examples of Brimley's handiwork and a replica of his museum office — visions of yesteryear.

The star attraction of the second floor is George, the 15-foot, 150-pound python. George spends most of his time just lying around, but he makes a big impression on people just the same. He shares the area with an assortment of poisonous snakes and lizards (all safely confined) and several less fearsome

RALEIGH, NORTH CAROLINA



creatures that occupy the Life Wall.

The cool blue colors of the Whale Hall carry you into the ocean depths where whales and dolphins are at home. Giant whale skeletons are suspended overhead, and at the touch of a button the entire room echoes with the songs of the humpback whale, one of nature's finest musicians.

The third floor was the first to be remodeled under Funderburg and it is a transition between the old-style cases crammed with birds and the newer habitats, such as the overgrown barnyard display. The barnyard, like all of the new exhibits, shows the painstaking attention that is paid to every detail in the design and construction of exhibits.

"Everything is a decision — and it all has to be right — or as right as we can make it," says Dan Lyons, Curator of Exhibits. The Virginia creeper vine that winds its way across the old barn required more than 300 hours of work. Painting one skink [a small lizard] for a lobby diorama took three days to airbrush four to five colors on each tiny scale. [The freeze-drying method used to preserve many small animals removes their natural colors.] Brimley's office was carefully reconstructed from old photographs right down to the 1931 copy of *Field and Stream* and the view of downtown Raleigh from the office windows.

In one of the large rooms used for school groups I found Mary Ann Brittain on her hands and knees in the middle of a group of excited youngsters. "Have you ever shaken hands with a frog?" she asked.

The Museum's educational programs are an outstanding feature of its current development, and as Curator of School Services, Mary Ann has her hands full. The group she's with today provides a special challenge — they are participants in a program for the visually and hearing impaired sponsored by the Raleigh Parks and Recreation Department. She's introducing the group to a number of the museum's residents — a box turtle, a salamander, a screech owl, an albino skunk.

As she moves around the circle with a grey treefrog clinging to her hand, she says, "Look how he holds on . . . look at his feet. Hold out your hand 'cause this frog's gonna shake hands with you!"

She lets each child feel the tiny suction cups on the frog's feet, encouraging those more squeamish by telling them, "If you touch them you get less afraid — that's a good reason to touch them."

She takes Kyle's hand — he's blind — and guides it gently over the frog's body, pausing at the throat. "Feel him breathing?" she asks. "Can you feel it?"

"Gosh!" was about all Kyle could say, but the expression on his face said the rest.

The Museum's Education Section offers a wide variety of activity-oriented, people-oriented programs throughout the year (see box). Some take place at the museum, incorporating the exhibits, live animals, specimens from the collections and slide programs. Others take people beyond the walls of the Museum and into the natural world.

"The programs we offer are our way of exposing the citizens of North Carolina to natural sciences first-hand," said Bob Wolke, the Museum's new Education Director. "Our role is to interpret the museum to the public."

Ken Taylor

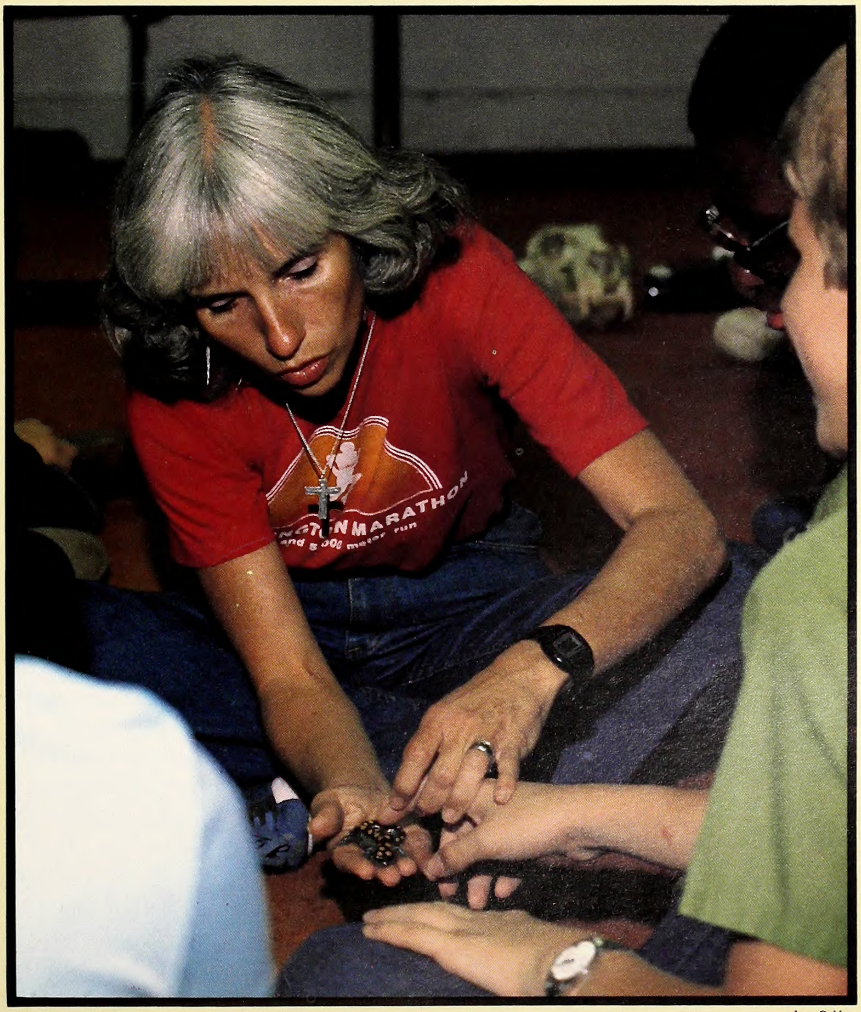
The heart of the Museum, and its largest branch, is the one most of us are least aware of — the Research and Collections Section. Its function is to systematically assemble and maintain collections, particularly of southeastern fauna, minerals, and fossils, with an emphasis on North Carolina.

"It's the research function of the Museum that sets it apart from all the other 'nature centers' in the State," according to David S. Lee, Curator of Ornithology and Mammology at the Museum. "The type of research we're doing isn't necessarily pioneer, frontier-type biology. We're just getting down to the nuts and bolts of things."

In many cases particularly with nongame animals, research is still at the basic inventory stage. Researchers want to know more about what animals occur in the State and where. What are their habitat requirements? How do they interact with other species? Some of the research even involved describing new species. It's hard to believe that after all these years of human

Jane Rohling

Jane Rohling



Jane Rohling

Whales teach, or at least their bones do in the whale exhibit (left) at the Museum. The skeletons of these finback and sperm whales educate visitors about the giant scale of natural forms. But to Mary Ann Brittain, Curator of School Services Mary Ann Brittain (right), a frog is a giant educational experience for a blind child. The Museum's educational programs are held both indoors and out. At the Museum's Spring Jubilee, Museum instructors guided young hands in making nature prints (top). Other participants could sample nature photography, birdwatching, basket weaving and other nature-oriented activities. Spring wildflower field trips (above), led by Lucy Lafitte, were only one of a full slate of Museum courses on subjects as diverse as edible insects, fossil hunting, growing orchids and the world of the whelk. A summer series of natural history workshops for children has been popular since 1977. Children wade in creeks, ride horses, hunt for frogs and snakes and learn about nature first-hand.

Field Trips Take The Museum Outdoors

The Education Section of the North Carolina State Natural History Museum offers a wide variety of programs that are designed to stimulate interest in the natural history of the state through hands-on activities.

School Service Programs are avilable free to any school in the state from October through April. They usually include a slide program, a hands-on experience using live and prepared specimens, and the study of pertinent exhibits. Teachers who schedule their classes for a Museum visit receive an outline of the program in advance, along with some recommendations on pre- and post-visit activities for their students. The education staff encourages teachers to integrate their Museum experience into their classroom studies.

In addition to these school programs, the Museum offers several workshops in natural history to teachers.

"The Museum places a big emphasis on teacher training," said Mary Ann Brittain, Curator of School Services." If we can affect some attitudes and teach some skills to teachers, then we can have a much greater impact on the children across the state."

Extension Programs are offered to the public all year and are often held away from the Museum. There is usually a minimal fee for these programs. There are programs for adults, youngsters and families, and they usually take place after school, on weekends, or in the evening. Some of these programs are strictly excursions — a fossil-hunting trip and a weekend visit to a coastal gull and pelican breeding island and heron rookery were favorites this year. Other programs combine field trips with related classes held at the Museum.

Other Extension programs include several five-day summer workshops for children from four to 14 years old, and the "Sunday at Three" family lecture series held one Sunday each month at the Museum.

Brochures are available for more information on the School Services Programs, and Extension Programs are published quarterly in "Whalebones," the Museum's newsletter. Requests for information should be directed to:

Mary Ann Brittain, Curator of School Services or
Jesse Perry, Curator of Extension Programs
North Carolina State Museum of Natural History
Post Office Box 27647
Raleigh, North Carolina 27611
Phone: (919) 733-7450

habitation there are still creatures out there that we haven't even discovered yet, but it's true. Museum researchers have recently identified several species of centipedes, a new salamander and a new glass lizard.

Field work, which may involve collecting specimens or just recording the presence of certain species and describing their habitats, is the first step in most research programs.

For each specimen, data such as locality, sex, age, size, and weight are recorded in catalogs and card files. The date is collected and recorded in a standard scientific format that is used by researchers nationwide. This data, along with the preserved specimens, can be used to study things like species distribution, species, individual or geographic variations, and life history. And unlike much of the information collected these days, this information can't just be stored in a computer — the data and the specimens must be kept in the same place.

Dr. Funderburg is often asked questions like, "Why do you need so many blue jays in the collections?"

His answer is simply, "We don't know."

"We'll continue to add to the collections because who knows what people 50 years from now will want to know about what's going on today? Who knows what will happen to species that are common today? Who could have convinced people a hundred years ago to collect and study the now extinct passenger pigeons?"

Since 1975, the Museum staff has made over 150 research trips to the Gulf Stream to study sea birds and marine mammals. This work has documented that the largest diversity of marine mammals occurring in the North Atlantic is found off the North Carolina coast, apparently attracted by the same nutrient-rich waters that make the Gulf Stream one of the most popular sport fishing grounds in the world. Some of the species recorded were previously unknown in the Western North Atlantic and most were new records for North Carolina. Researchers are gathering data on seasonal occurrence, food habits, parasites, migration patterns, body temperatures, and feather molt sequences. In addition, heavy metal concentrations in body tissues are being measured to determine the levels of certain pollutants.

"One hundred years ago, the collectors just routinely collected things," said David Lee. "They didn't really know the value and wisdom of what they were doing at the time."

During the early years of the Museum there were no collections maintained purely for scientific purposes, yet these aged specimens are still able to supply valuable data today. We can pull out a feather from a pelican that was collected 100 years ago, before there were so many problems with chemicals that have been introduced into the environment, and use it to compare with chemical levels in specimens being collected today.

Aldo Leopold, one of our greatest conservationists, once said that the first rule of intelligent tinkering is to save all the pieces. Researchers like the dedicated scientists at the State Museum must be acutely aware of the truth in this statement.

Even while renovations of the current facility are still underway the staff is looking ahead towards yet another goal. Eventually these professionals hope for an educational facility with both indoor and outdoor teaching areas. They have a vision of a facility with adequate space for large, life-sized habitat groups depicting animals from all over the world, a place where all of their growing collections could be housed under one roof.

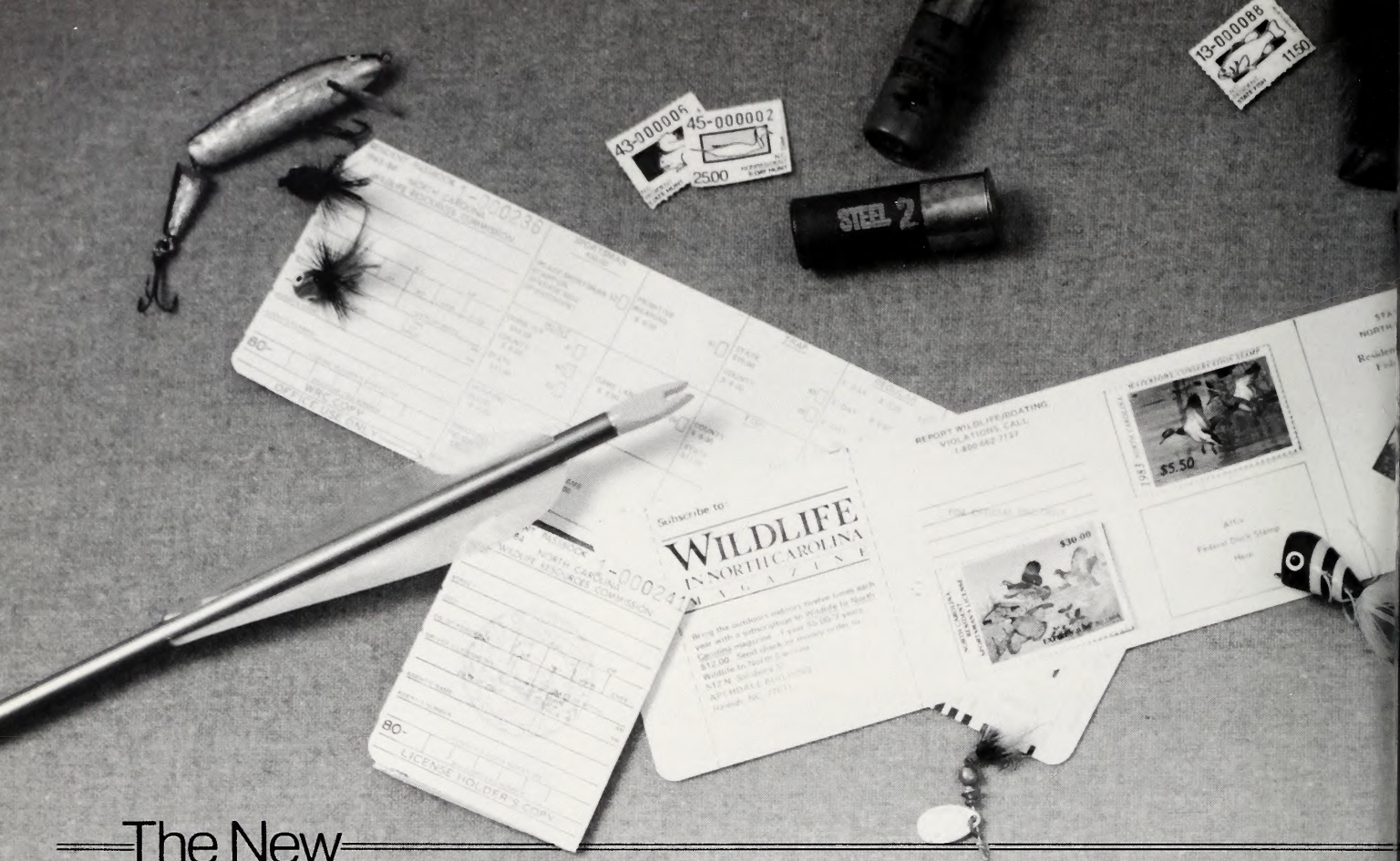
Dr. Funderburg hopes that by 1990 this dream will have become a reality. Until then, the Museum staff will continue to expand both the collections and exhibits at the present location, and they will continue to provide a wide range of excellent programs and services to the citizens of North Carolina.

The old Agriculture Building in the Bicentennial Plaza may look about like any other State office building to those who pass by. But the natural treasures waiting to be discovered behind its doors are something everyone should take time to discover. Why not take a look next time you're in Raleigh? ⊠

Jane Rohling

Behind the scenes work brings exhibits to life. Museum staffer Gilbert Grant prepares specimens with a summer intern in the Ornithology and Mammalogy Lab (above). Hundreds of hours went into the preparation of the mounted coral snake (below) and its forest habitat. An exacting attention to detail is the key. Research puts the backbone in all Museum activities. Museum researchers study the habits of creatures and are even discovering new species.

Ken Taylor



The New Passbook License

Tar Heel sportsmen are carrying a new type of license this fall. Here's how it works and why it is needed.

By Mark Taylor

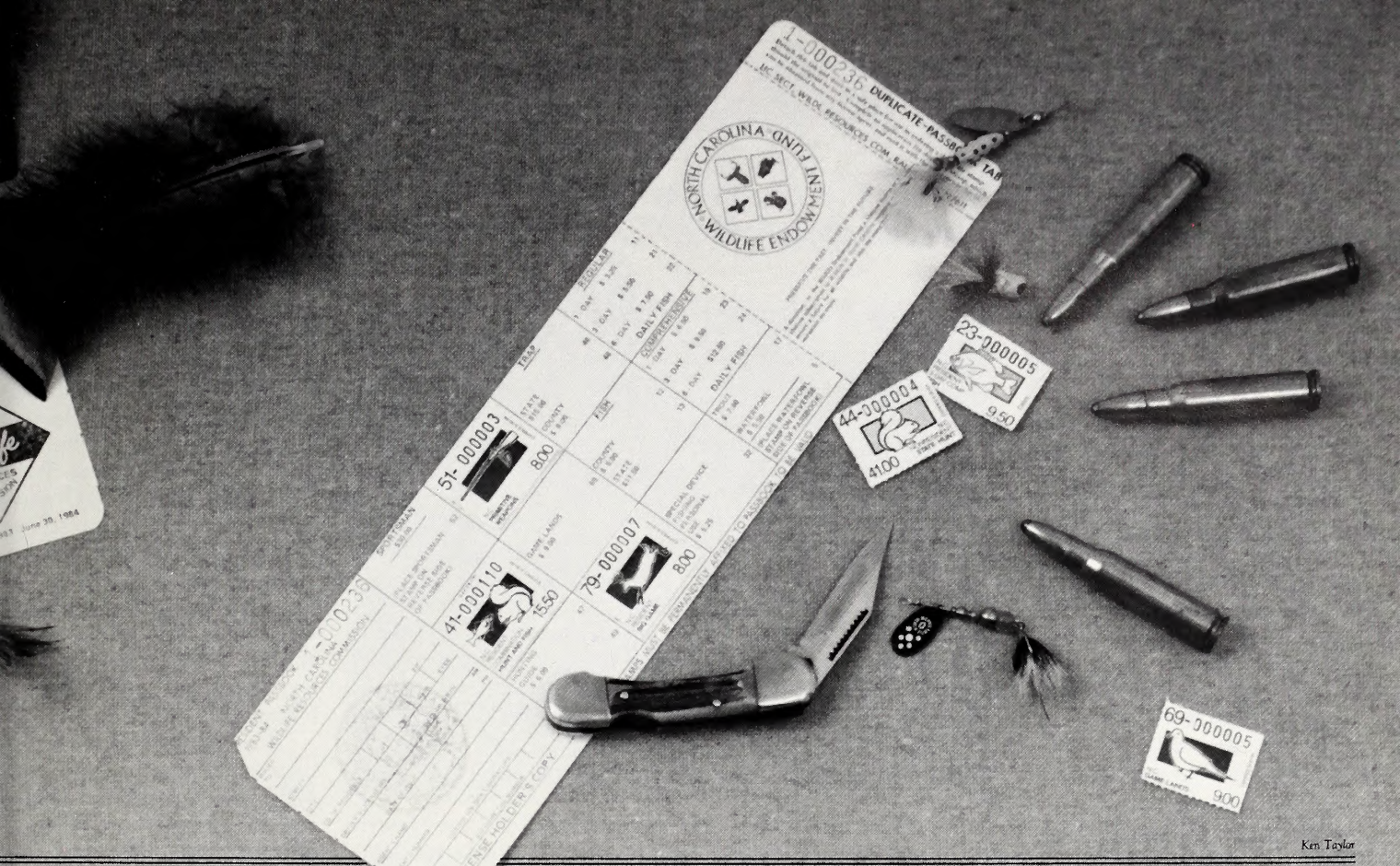
For the first time in 30 years, North Carolina hunting, fishing and trapping licenses have gotten a major face-lift. The N.C. Wildlife Resources Commission recently consolidated the old hunting, fishing and trapping licenses into a "passbook" license format. The new license features a single passbook, and sportsmen purchase pictorial stamps signifying various hunting, fishing and trapping privileges that are pasted into the passbook. The new licenses have several advantages. The Wildlife Commission will be able to computerize its license files, and this will result in savings of manpower. Sportsmen will have to carry only a single license instead of several, and license agents will have to write up only a single passbook when a sportsman purchases several different license privileges. The old regulations digests for fishing and hunting and trapping have also been consolidated into a single regulations digest covering all three activities.

"In essence, we are evolving our license program from the 1950s to the 1980s," said Vernon Bevill, executive director of the N.C. Wildlife Resources Commission. "Many states are doing this, and the new license format will allow us to take advantage of the new computer technology. In the long run we hope to run a most cost-effective program, which is already being managed with fewer wildlife employees than ever before."

The provisions for establishing county hunting and trapping seasons for fox was one of the reasons for the change in license formats. One provision in this legislation requires that a petition from 15 percent of the total licensed hunters and trappers in a county must be sent to the Wildlife Commission before a study of the proposed county fox season is begun. These petitions must be verified by the Wildlife Commission for validity, and two additional bits of information not included on the old licenses were needed.

"Although the old license listed the holder's home address, there was no entry for his home county," said Richard B. Hamilton, chief of the Commission's Division of Inland Fisheries, who helped design the new license. "Consequently, there was no convenient way to get a breakdown of the numbers of hunting and trapping license holders in a particular county. There was also no efficient way to verify the names and addresses on the petitions. By requiring the driver's license number, however, we can check the names and addresses against the latest Department of Transportation computer file, which is very accurate. This enables us to quickly verify that those signing the petition are residents of that county."

The usefulness of the new license system is not confined to the fox management



Ken Taylor

program. In fact, it will improve many of the Wildlife Commission's fisheries, wildlife and enforcement programs. It will also help us detect non-residents attempting to purchase resident licenses, which is a problem in some areas.

"There are over a half-million licensed sportsmen in North Carolina, and one of the only ways to keep in touch with this constituency is through an efficient license-filing system," said Hamilton. "Any of the statistical studies which the Wildlife Commission does — for example, an angler-opinion survey or a small-game hunter success study — relies on the license file for background information. In the past, wildlife and fisheries biologists spent untold hours hand-pulling license entries from the license files for these studies, and then trying to design a random sample that was statistically valid. Now, using electronic scanners we can get a complete breakdown of the types of licenses sold in a particular area. Then, using the DOT computer program we are able to get the latest addresses of the licenses we select. Another computer program allows us to select a random sample from this group. Consequently, by doing all of this through computer programs, we save time and expense and also end up with better studies."

The new system will also be more efficient for the Wildlife Commission. Although the costs of printing the new licenses are about the same as they were under the old system, the costs of processing licenses will be lower.

"The new license form allows us to capture and store the information needed for fox studies and other management programs on a single computer program," said Connie Spivey, chief of the Wildlife Commission's Division of Administrative Services. "Using our old system, we would have had to manually keypunch and store about one million pieces of data to obtain this information — which we could not have done with our current operation or staff. Computerizing all of this data will enable us to maintain our license files with less manpower, and will also reduce the storage space needed for the license file."

Spivey adds that in some ways the new licenses are more convenient for license agents. True, agents are required to fill out two additional entries that were not required on the old licenses — the driver's license number and home county of the purchaser. However, this is offset by the consolidation of several license forms into a single license.

"Many sportsmen purchase several different licenses at once, and under the old system each license form had to be filled out separately. For example, if a man bought a hunting license and trapping license, two forms were needed. Now, the agent only has to fill out a single form for both of these activities, and he just pastes the stamps signifying hunting and trapping privileges into the passbook."

Sportsmen will also find the new licenses convenient and attractive. The pictorial stamps are also attractive, and if you buy the sportsman's license you'll get to look at a stamp showing a handsome covey of quail flushing from an old field. The stamp was done by well-known wildlife artist Duane Raver, who was editor of this magazine for many years.

In fact, you'll probably want to save your new license when the year is over. It would go nicely with a limited-edition print of the North Carolina Sportsman's stamp on the wall of your den. Stamp collecting is one of the world's biggest hobbies and our stamps are collectable. We have had numerous inquiries by collectors who will, by their purchases, add revenue to help run Commission management programs.

For Safer Hunting

Blaze–Orange Saves Lives

Written and Edited by Mark Taylor

What should every hunter bring on a deer-hunting trip? Blaze-orange clothing is one item that should not be overlooked. Although some hunters claim that blaze-orange spooks deer, there is no evidence that this is true. There is, however, overwhelming proof that blaze-orange saves lives. Consider these statistics from states where blaze-orange clothing for hunters is required.

– Alabama has reported only two accidents where the victim was wearing blaze-orange clothing. One of these was the result of a ricochet, the other caused by a stray pellet in dense brush.

– Connecticut reports that since passing a mandatory blaze-orange law for hunters, almost all accidents are now self-inflicted.

– In Maryland, three accidents have occurred where the victims were wearing blaze-orange. In two of these cases, the shooters were prosecuted for murder.

– Minnesota has had no "mistaken for game" accidents where the victim was wearing blaze-orange.

– Wyoming has had no "mistake for game" accidents since 1973, when blaze-orange was first required for big-game hunters.

"Although blaze-orange clothing is not required for hunters in North Carolina, we certainly encourage all hunters to wear it," said Winfield Rhyne, assistant chief of the Wildlife Commission's Division of Enforcement. "This is especially important for deer hunters. However, sportsmen hunting small game — especially grouse, quail and rabbits — should also consider wearing blaze-orange. These animals are often hunted in dense cover, and blaze-orange is a great help in keeping track of other members of your party. Finally, we urge every hunter to be absolutely sure of his target before shooting. Once you fire a bullet you can never bring it back, and a hunting accident is a tragedy that will haunt you for the rest of your life."

Posters Available

Ken Taylor

Signs of the Old North State: *Posters featuring Duane Raver's painting of North Carolina's official state symbols are still available, and have been very popular with teachers. Funds generated by the sale of these posters help finance the publication of the* Carolina Notebook, *an environmental-education aid available for $2 each including mailing from the N.C. Wildlife Resources Commission, Division of Conservation Education, 512 N. Salisbury St., Raleigh, N.C. 27611.*

Two Re-appointments, One New Commissioner

The Changing Of The Guard

Some familiar and new faces have been appointed to the Wildlife Commission. Recently, Governor James B. Hunt Jr. re-appointed Eddie Bridges of Greensboro, Wildlife Commissioner for District 5, and Woodrow Price of Gloucester, Wildlife Commissioner for District 2, to serve second terms representing their districts. Both terms of office expire in July of 1989. Bridges was instrumental in the establishment of the Wildlife Endowment Fund, and has served on many committees within the Commission. Price was re-elected to serve a fourth term as vice-chairman of the Wildlife Commission, and has also served on many Wildlife Commission committees. J. Robert Gordon of Laurinburg, chairman of the Wildlife Commission, was elected to another two-year term as chairman.

The new face on the Wildlife Commission is Dr. Jack Hamrick Jr. an orthopaedic surgeon from Shelby. Dr. Hamrick was appointed by Governor Hunt to serve as Wildlife Commissioner for District 8, and his term of office will expire in July of 1989. He is an enthusiastic outdoorsman, and enjoys hunting for waterfowl and upland game and fishing for trout.

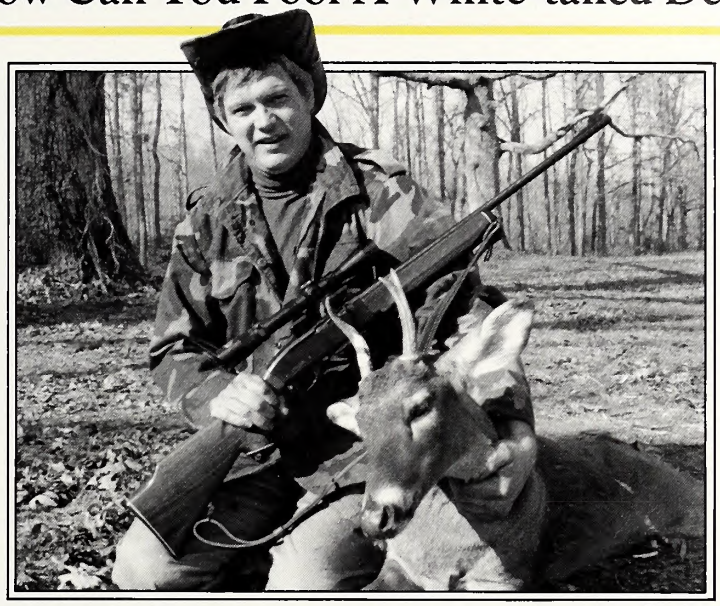
"We're very pleased with these appointments to the Wildlife Commission," said J. Robert Gordon of Laurinburg, chairman of the Wildlife Commission. "All of these men are dedicated conservationists, and will serve the sportsmen of North Carolina well."

Kay Frazier

The Oath Of Office: *Two Wildlife Commissioners were recently re-appointed to serve second six-year terms on the Wildlife Commission, and a new commissioner was appointed to serve a six-year term. From left to right are Dr. Jack Hamrick Jr. of Shelby, new commissioner for District 8, Woodrow Price of Gloucester, re-appointed to represent District 2, and Eddie Bridges of Greensboro, re-appointed to represent District 5.*

Clean Up Your Act

How Can You Fool A White-tailed Deer?



Terry Shankle

Tricks Of The Trade: *Many successful deer hunters have found that masking human odor is one of the keys to putting venison in the freezer. Storing hunting clothes in outbuildings away from people helps, and the use of deer scents and lures is also popular.*

Which of the white-tailed deer's senses are the keenest? Eyes? Ears? Nose?

As most accomplished hunters know, a deer's sense of smell is one of the finest in the wild. The hunter who fails to realize this and act accordingly may occasionally take a deer, but most deer that come his way will smell him first and be seen at a distance if at all.

As bowhunting has increased in popularity in recent years, hunters have needed to learn to get much closer to deer to get good, clean shots. Many camouflage products help, but they still do nothing to hide smells. However, both natural and man-made items are available that will help hunter's fool a deer's nose — making that close shot a reality.

Scents, odors and lures each have distinct differences. Deer accept scents such as skunk, fox and other deer as natural, and are not alarmed by them. Odors, especially human odors, are not natural, and usually frighten deer. Lures are yet another method of fooling a deer's nose by playing on its mating instincts.

The deer hunter's worst enemy is usually his own odor. In fact, the average hunter — to a deer — reeks. Several days spent in a hunting camp with the guys may offer great fellowship, but the odors generated are numerous and can affect the hunt.

These odors are emitted by the body, hair, mouth, clothes, boots and firearms, and controlling these odors is imperative for consistent hunting success. Frequent washing of both the body and clothing is important, and it's best to refrain from eating highly spiced foods. Strong smelling solvents and oils used on firearms should also be avoided during the hunting season.

The hunter who doesn't store his hunting gear in the living area of a house is ahead of the game. Gear will pick up a lot less human odor if it is stored in a basement, barn or shed well away from a dwelling. Also, try not to get gasoline on your hands while pumping gas. Use of tobacco products should be avoided because of their smell and the movement involved with their use. Scented deodorants, soaps and after-shave lotions should be exchanged for unscented varieties during the hunting season. Finally, since urine is a strong odor producer in any animal, bring an empty bottle with you to your deer stand. Many hunters ruin good stands by urinating near them.

After the maximum effort has been made to eliminate human odor, there may still be enough left to alert deer. Now, the decision must be made to mask this odor with a cover scent, lure, or both.

Cover scents come in a wide variety of forms. Some of the simplest are pine and cedar boughs rubbed on boots and hunting clothes. Artificial scents which imitate evergreens, apple and fruit trees, and other vegetation should be used with care — be sure the scent you are using is native to your area! Barnyard manure is also an excellent cover scent, and it's a good idea to step in some on your way to the hunt (you'll find this amazingly easy). Some hunters in heavy farming areas even swear by diesel fuel as a cover scent because deer in these areas are used to the smell of farm machinery. All of these scents are familiar to deer, and raise little curiosity.

Fox or deer urine placed on boot soles with an applicator are both excellent cover scents. However, the only scent that will completely cover human odor is skunk, and it goes without saying that careless use of skunk scent can be disasterous. A good way to transport cotton balls or Q-tips dabbed with skunk scent or other scents is to enclose them in plastic, 35-millimeter film containers. Never place skunk scent on your clothing or body if you value any close, personal relationships!

Lures, which are used to attract buck deer to an area by using the scents of a doe in heat or the scent of another buck that is violating territorial boundaries, are probably the most controversial method of fooling a deer's fine sense of smell. Doe-in-heat lure has become quite popular recently, and is simply urine collected from captive deer. The smell of a buck intruding on another buck's territory is often simulated by bottling musk or by using musk glands taken from the rear legs of bucks that were killed during the rutting period. These glands are often safety-pinned to pants cuffs or caps. Be sure not to get any of these lures on your body, and here again plastic film cannisters come in handy. Also, always take whatever lure you've been using with you when you've finished hunting.

Use of scents and lures is a valuable tool. However, they will have little effect without a genuine effort to control human odors. You may occasionally get lucky, but the best and most successful hunters know whose nose must be fooled!

— Terry Shankle

Nongame Tax Refund Checkoff Passes

Good News On The Legislative Front

Several wildlife-related bills were passed in the 1983 session of the General Assembly. The most significant was the passage of Senate Bill 146, popularly known as the Nongame Tax Refund Checkoff Bill. This bill will allow North Carolinians who receive refunds on their State income tax returns to voluntarily designate all or a portion of their refunds to be used for the management of nongame and endangered wildlife species. This bill was introduced by Senator Joseph Thomas of Craven County, and had the strong support of Governor James B. Hunt Jr.

"This legislation is for the benefit of current and future generations," said Governor Hunt. "Our wildlife and natural resources must be protected, and this tax refund checkoff is a good way to let all citizens cooperate in protecting that heritage. We all studied this proposal carefully, and I was pleased to support this bill."

Similar programs exist in 21 other states, and have been very successful. Minnesota, for example, raised over $523,000 for nongame and endangered wildlife in the first year of its tax checkoff program, and wildlife officials expect the program to be very popular in North Carolina. Funds generated by the tax checkoff could be used for a variety of nongame and endangered species programs — including the bald eagle restoration project at Lake Mattamuskeet National Wildlife Refuge, which began this year, and the endangered sea turtle project which has been under way for several years.

Other projects that could be funded by the tax checkoff program would include the development of urban wildlife areas, education programs dealing with wildlife conservation, environmental education in the schools, and a host of other activities.

"As an outdoorsman with a strong interest in wildlife conservation programs, I was pleased to support the Nongame Tax Refund Checkoff Bill," said Senator Thomas, who has served two terms as Chairman of the Senate Committee on Natural and Economic Resources. "This bill was the greatest piece of legislation that our committee handled in this session, and I'm happy that the legislation passed. It offers North Carolinians an excellent opportunity to help nongame and endangered wildlife."

Several wildlife bills were also passed. They are as follows:

– SB 202 increased license fees for hunting, trapping, fishing and dealing in furs.

– HB 363 authorized the Wildlife Resources Commission to conduct managed hunts on game lands, and to charge fees for processing applications and the use of related facilities.

– HB 994 authorized the Wildlife Commission to regulate the use of handguns in taking big-game animals.

– HB 1198 regulated the taking of exotic species of wild animals and birds or species not indigenous to the area.

– SB 420 required the numbering of all sailboats over 14-feet in length at the waterline.

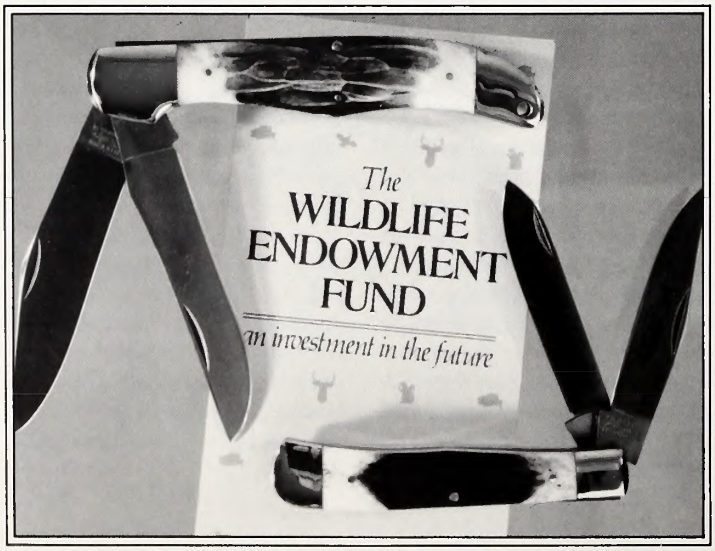
– HB 362 increased the fee for transfers of motorboat registration.

Ken Taylor

Better Days Ahead: *Endangered species like this nesting loggerhead sea turtle will benefit from the recent passage of the nongame tax refund checkoff bill. This new program allows North Carolinians to designate a portion or all of the refund on their state income tax returns to be used for the management of nongame and endangered wildlife in North Carolina.*

A Most Generous Gift

Ken Taylor



A Job Well Done: *The Parker Cutlery Company of Chattanooga, Tennessee, recently donated a check for $8,000 to the North Carolina Wildlife Endowment Fund. This donation came from the sale of a special series of "Wildlife Endowment Fund knives" shown at left commemorating the "Year of the Eagle" in 1982.*

"The Wildlife Commission is very grateful for this contribution from the Parker Cutlery Company," said J. Robert Gordon of Laurinburg, chairman of the Wildlife Commission.

Starting With Field Dressing

Care Of The Kill Is Key To Good Venison

North Carolina's deer herd is at an all-time high, and the number of deer hunters taking to the field increases every fall. Not surprisingly, many Tar Heels are being confronted with the opportunity to try venison steaks, roasts, and hunter's stew for the first time. Some are finding venison to be uniquely delicious. Others say that those who find venison to be uniquely delicious are welcome to it. I often wonder, however, if those who say they don't care for venison truly have a distaste for it, or whether their position might be based on a dish that was poorly prepared in the kitchen, or meat that was improperly cared for in the field.

Since deer are never killed under packing-house conditions, special care is called for. The first step is proper field dressing, a skill at which many hunters are quite adept. They know that it's important to field dress a deer immediately after the animal is killed, and that the carcass should be hung to drain and the body cavity propped open so that body heat will escape. Once the deer is field-dressed and ready for butchering, a dilemma often sets in.

What is the best way to reduce your field-dressed deer to packaged steaks and roasts? One option is to cart the deer down to a neighborhood butcher, and return for finished packages of meat a day or two later. Often, however, the butcher cuts up the deer just as if it were a beef critter — which it's not. The problem occurs with the fat, membranes and connective tissues in deer. Fat provides much of the flavor in any meat, but the fat in deer meat is very unstable and quickly turns rancid. This rancid fat — which is often left on cuts of venison — is largely responsible for the "gamey" taste in deer meat which many people find distasteful. The connective tissues in deer meat also contract under heat, much more so than with beef, which often makes the meat tough.

So, what is the solution to this problem? The answer is, "cut up your deer at home." Venison doesn't "marble" like domestic beef — the fat occurs on the outside of the muscle, making it easily trimmed and removed. With a little bit of attention, muscles can be separated as they appear on the bone. Membranes and tendons are also usually found on the outside of the muscle, and are easily trimmed and removed. It's a little more trouble, but the rewards of cutting up your deer at home will be an ample supply of virtually fat-free, tender cuts of meat that will be delicious in any recipe. If you don't have a favorite, try this one!

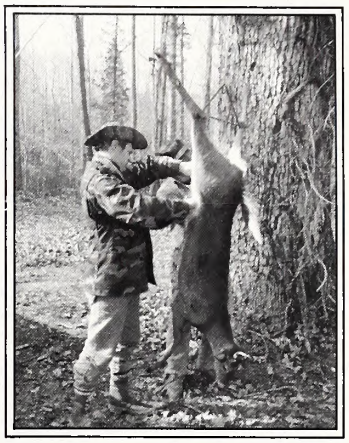
VENISON POT ROAST

4-lb. venison roast
several strips of salt pork
2 cloves of garlic
salt and pepper
3 tablespoons of olive oil
2 onions, coarsely chopped
flour
2 carrots, sliced
1-1/4 teaspoons oregano
1 teaspoon minced parsley
1 stalk of celery, chopped
1/2 cup beef bouillon
1/2 cup dry white wine
1 tablespoon paprika
1 cup sour cream

Push the strips of salt pork into the roast using a larding needle or a thin, sharp knife. Sliver the garlic cloves, and push into slots cut into the meat. Then, rub the roast with salt and pepper, roll in flour, and sear quickly on all sides in olive oil in a Dutch oven. Add onions, carrots, oregano, parsley, celery, bouillon and wine to the pot, cover, and simmer for two hours. Check to see if done, and add paprika and more broth if necessary. When done, remove to a hot platter, add sour cream to the broth, and heat until almost boiling. Serve the roast sliced with a ladle of sauce over each piece.

Buttered noodles go well with this dish, as does a rich, red wine — such as a California Cabernet Sauvignon. Enjoy!

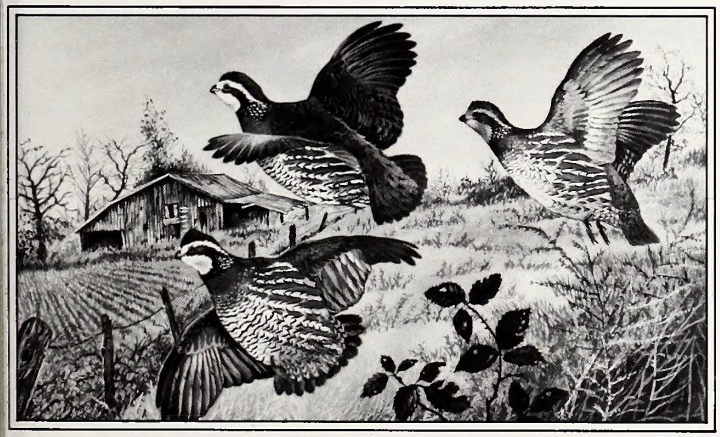
— *Curtis Wooten*



Terry Shankle

Take Care: *Proper field dressing of deer is one of the keys to turning out tasty venison dishes in the kitchen.*

Help Tar Heel Wildlife



Ken Taylor

Everybody Needs One: *Prints of North Carolina's 1983 sportsman's stamp which was done by well-known North Carolina wildlife artist Duane Raver, are now available. The image size is 6-1/2 inches by 9 inches, and orders for this time-limited edition will be accepted through March 31, 1984. The cost of the prints is $90. Also, sportsman's stamps which are not sold by June 30, 1984, will be available to collectors for $7.50 each. This print of North Carolina's first sportsman's stamp is expected to appreciate in value considerably in the future. A royalty from the sale of each print will be donated to the Wildlife Commission, and will be used for wildlife conservation. These prints are not being sold by the Wildlife Commission, but are available from art dealers throughout North Carolina.*

North Carolina Calendar Of Events

October 1-2
North Carolina Spot Festival at Hampstead. Features beauty pageants, sporting events, and spot dinner.

October 2
50th annual Any and All Dog Show at Harmon Field in Tryon. For more information, contact the Tryon Riding and Hunt Club, P.O. Box 1095, Tryon, N.C. 28782.

October 6-8
Surf Fishing Tournament at Nags Head. For more information, contact the Nags Head Surf Fishing Club, P.O. Box 626, Kill Devil Hills, N.C. 27948.

October 6-8
U.S. Open King Mackerel Tournament at Southport. For more information, contact Buddy Rudd, Rt. 1, Box 52, Southport, N.C. 28461.

October 7-8
Bascom Lamar Lunsford Mountain Music and Dance Festival at Mars Hill College, north of Asheville. Festival features traditional mountain music, dance, and arts and crafts. For more information, write to Mars Hill College, Dr. Harold Herzog — Festival Director, Mars Hills, N.C. 28754.

October 7-9
Fifth Annual North Carolina Waterfowl Weekend at Nags Head. Features decoy carving, auction, workshops on waterfowling. For more information, contact the Outer Banks Chamber of Commerce, P.O. Box 90, Kitty Hawk, N.C. 27949.

October 8
Annual Mullet Festival at Swansboro. Features parade, exhibits, and a fried mullet supper.

October 8-9
North American Indian Festival and Fall Pow-wow at the Schiele Museum in Gastonia. Features dance exhibition, stories and legends told by Indians, and a tepee village. The museum also has an outstanding collection of North Carolina Indian artifacts. For more information, contact the Schiele Museum, P.O. Box 953, Gastonia, N.C. 28052.

October 14-16
Third annual North Carolina Oyster Festival at South Brunswick Island in Shallotte. Features oyster roast, shucking contest, fish fry, and sporting events. For more information, contact the South Brunswick Islands Chamber of Commerce, P.O. Box 784, Shallotte, N.C. 28459.

October 14-16
10th National Balloon Rally in Statesville. For more information, contact the Balloon Works, Rhyne Aerodrome, RFD 2, Statesville, N.C. 28677.

October 14-22
North Carolina State Fair at the State Fairground in Raleigh.

October 15
Lumberjack Day in Burnsville. Features competition in log rolling, pole felling, chopping and other manly arts. For more information, contact the Yancey County Chamber of Commerce, 2 Town Square, Room 3, Burnsville, N.C. 28714.

October 20-23
Annie Oakley Trapshoot at the Pinehurst Gun Club. For more information, contact the Pinehurst Gun Club, P.O. Box 4000, Pinehurst, N.C. 28374.

October 21-23
Intra Coastal in the Water Boat Show and Aquafest. Festures traditional wooden boats, contemporary boats, sailboat races, fishing tournaments and other events. For more information, contact Intra-Coastal Groups, Bill Price, Box 730, Morehead City, N.C. 28557.

Only $5

1983-84 North Carolina Wildlife Calendar

Six nationally known wildlife artists have contributed fine outdoor and wildlife paintings to the 1983-84 calendar. Their paintings are in museums and private collections throughout the country, and you've seen examples of some of their work in WILDLIFE IN NORTH CAROLINA magazine. This calendar is almost certain to become a valuable collector's item with such artists featured as:

- Bob Binks
- Bob Dance
- Cecil Eakins
- Larry Barton
- Duane Raver
- Lee LeBlanc

Calendars are $5 each; however, if you purchase 50 or more, we will sell them to you for only $4 each.

This is a project of the Chairman's Wildlife Advisory Committee, a group of North Carolina conservation leaders who have been appointed by the Chairman of the Wildlife Resources Commission to provide information, guidance and support for the agency's wildlife conservation programs. Proceeds from the calendar will go for these purposes.

Yes, please send me _____ copies of the North Carolina Wildlife Calendar. I have enclosed cash, check or money order for _____. We do not bill.

Name _____

Street _____

City _____ State _____ Zip _____

Phone Number (including area code) _____

Return form and payment to Chairman's Wildlife Advisory Committee, care of George Mason, P.O. Box 473, Dallas, N.C. 28034 or give the form to a member of the committee. Checks should be made out to the Chairman's Wildlife Advisory Committee.

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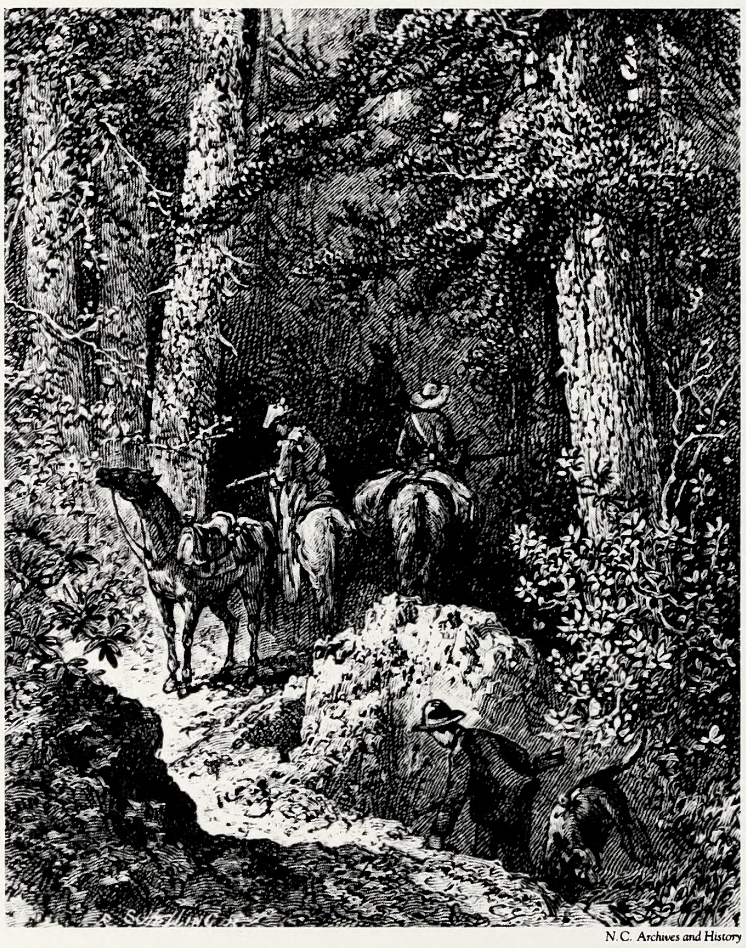
Where The Wind Comes From

by Jim Dean

A few years back, two boys about 8 years old wrapped a double handful of cookies in tinfoil, cut two walking sticks out of a ligustrum hedge and walked up the street to a culvert where a small creek flowed. They followed the creek upstream through backyards and a city park. In the pools, the water was murky, but where it ran over pebbles, it seemed clear. After walking perhaps half a mile, the boys entered a wooded area and lost sight of the houses. Tall reeds and dense brush shrouded the creek, filtering out the sound of traffic, barking dogs and mothers calling their children home to supper.



N.C. Archives and History

At a spot where the creek tumbled over a series of bedrock ledges, they sat down and looked around. This was it, they figured. We're in the wilderness. They ate their oatmeal cookies, and drank out of the most polluted creek in Raleigh.

After I realized that my son and his friend were not going to die of typhoid or something worse, I began to appreciate what they had done. I remembered a boy about their same age who — 30 years earlier — had decided not to go straight home from the swimming pool one summer afternoon. Instead, he had followed a ditch for about a mile and wound up on the moon.

At least that's what I thought it looked like. Actually, it was a huge expanse of waste pine bark that covered many acres of low land near the Roanoke River below a pulp mill on the outskirts of town. There were deeply-cut trails through the chips, and in one place, I found a cave in a shelf of pine bark. I walked that maze half believing that no one had ever been there before. And on the way home, I drank some of the oily water from the ditch (I had a better sense of ritual than plain good sense).

Sooner or later all kids get that first taste of exploration, and it usually taps a lifelong wellspring; an insistent need to go beyond what is known. That current flowed again recently while I was reading A.B. Guthries' *The Way West,* a fictionalized, but technically accurate, account of the first wagon trains to travel from Independence, Missouri, to Oregon.

At one point a trapper, who had first traveled west in the 1830s, described his feelings upon seeing the same country again as a wagon-train pilot in 1845. Even that early, he was beginning to feel boxed in. The trapper "sat his horse and watched thinking how things had changed. This country was young, like himself, without the thought of age. There wasn't a post on it then, nor any tame squaw begging calico, but only buffalo and beaver and the long grass waving in the Laramie bottoms. The wind had blown lonesome, the sound of emptiness in it, the breath of far-off places where no white foot had stepped. A man snuggling in his robe had felt alone and strong and good, telling himself he would see where the wind came from."

Kids drinking from the polluted creeks over a century later were "seeing where the wind came from," although it is a sad comparison. Yet it is a comparison that can only become sadder. In just the past few decades, those of us who care about such things have suffered a steady and relentless loss. Many of the swamps and brackish backwaters I loved as a kid down east are gone, the rivers choked with algae. In the mountains, we exult in stolen moments of solitude knowing full well that just beyond the ridge the bulldozers are at work. Those places not already accorded wilderness status or something similar are being mopped up, and there is pressure to unlock some of the meager wild country we've set aside.

There will be no more Oregon Trails on this planet, although there will certainly be some to other galaxies. It's our nature to seek them — and, alas, often to leave a trail of destruction.

Maybe that's the best reason of all to lock up what remains of our scattered wilderness on earth. Few of us will explore the vast cosmos, but we can visit the remaining fragments of frontier here, and preserve at least the spirit of exploration. And we can do it without the stigma of destruction that accompanied the actual exploration undertaken by our forefathers. It is a substitute at best, but one many of us truly need.

Thoreau long ago wrote, "In wilderness is the preservation of the world." He was speaking not only of the resource, but of the spirit of mankind.

Raleigh

November, 1983
Volume 47, Number 11

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

CONTENTS

4 **I'll Take Sea Ducks** *by Joel Arrington*
There is good hunting in open coastal waters for these abundant ducks, though few hunters take advantage of it.

9 **Is Your Dog Healthy?** *by Mike Gaddis*
Careful breeding and training are not enough. To deliver peak performance, a dog must receive good kennel and health care.

14 **Bird Watching Comes Of Age** *by Curtis Wooten*
More than 20 million Americans already consider bird watching a major hobby, and their numbers continue to grow.

22 **Get Up For A Buck** *by Ed Jenkins*
If you want venison, the best place to get it is up a tree. Here's why and how.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

Back Of The Book *by Mark Taylor*

Cover *Wood ducks are among the most handsome of all puddle ducks, and perhaps the most abundant in the Southeast. Photograph by Leonard Lee Rue, III.*

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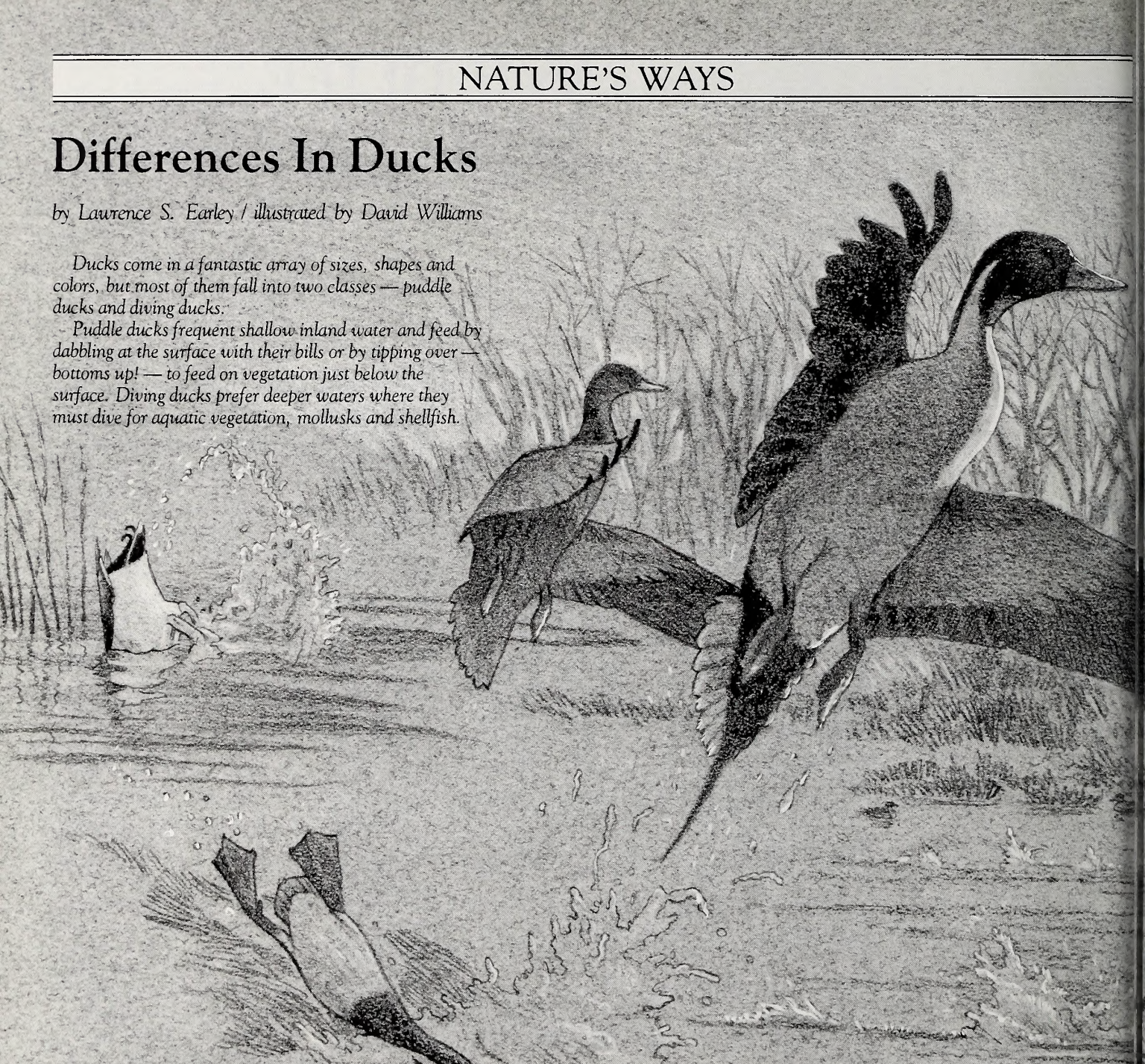
Differences In Ducks

by Lawrence S. Earley / illustrated by David Williams

Ducks come in a fantastic array of sizes, shapes and colors, but most of them fall into two classes — puddle ducks and diving ducks.

Puddle ducks frequent shallow inland water and feed by dabbling at the surface with their bills or by tipping over — bottoms up! — to feed on vegetation just below the surface. Diving ducks prefer deeper waters where they must dive for aquatic vegetation, mollusks and shellfish.



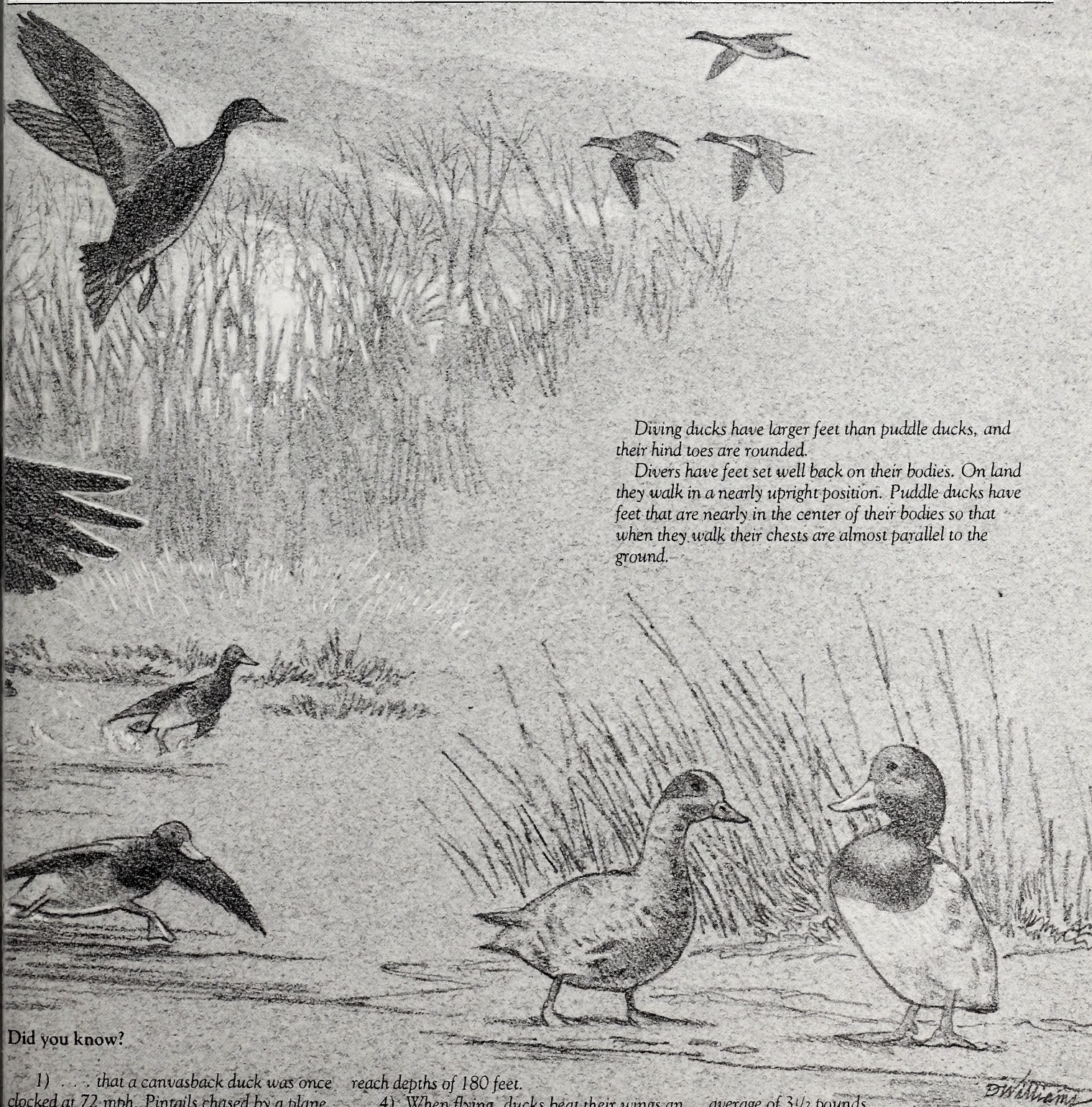
Puddle ducks spring straight up out of the water as if captapulted from a giant sling shot. Divers run along the water surface to build up momentum before they can become airborne. One reason for the difference is the size of their wings. Puddlers generally have larger wings than divers, helping them rise more quickly, and also giving them the ability to twist and turn through their woodland habitats. Their tails are larger than divers, too. Divers favor open water where maneuverability is not as necessary. Their smaller wings and tails are better for diving.

Common diving ducks:

canvasback
redhead
ringneck
scaup
goldeneye
bufflehead
ruddy
red-breasted merganser
common merganser
hooded merganser
white-winged scoter
surf scoter
black scoter
oldsquaw

Common puddle ducks:

mallard
pintail
gadwall
widgeon
shoveler
blue-winged teal
green-winged teal
wood duck
black duck



Diving ducks have larger feet than puddle ducks, and their hind toes are rounded.

Divers have feet set well back on their bodies. On land they walk in a nearly upright position. Puddle ducks have feet that are nearly in the center of their bodies so that when they walk their chests are almost parallel to the ground.

Did you know?

1) . . . that a canvasback duck was once clocked at 72 mph. Pintails chased by a plane reached speeds of 65 mph.

2) The blue-winged teal has the longest migration route of American waterfowl. One banded blue wing was recovered in South America, nearly 7,000 miles from its summer breeding habitat in Canada.

3) The canvasback can dive 20 to 30 feet, but most diving ducks dive an average of 15 feet or less. One species has been known to reach depths of 180 feet.

4) When flying, ducks beat their wings an average of six to eight times per second.

5) The mallard has over 12,000 feathers on its body.

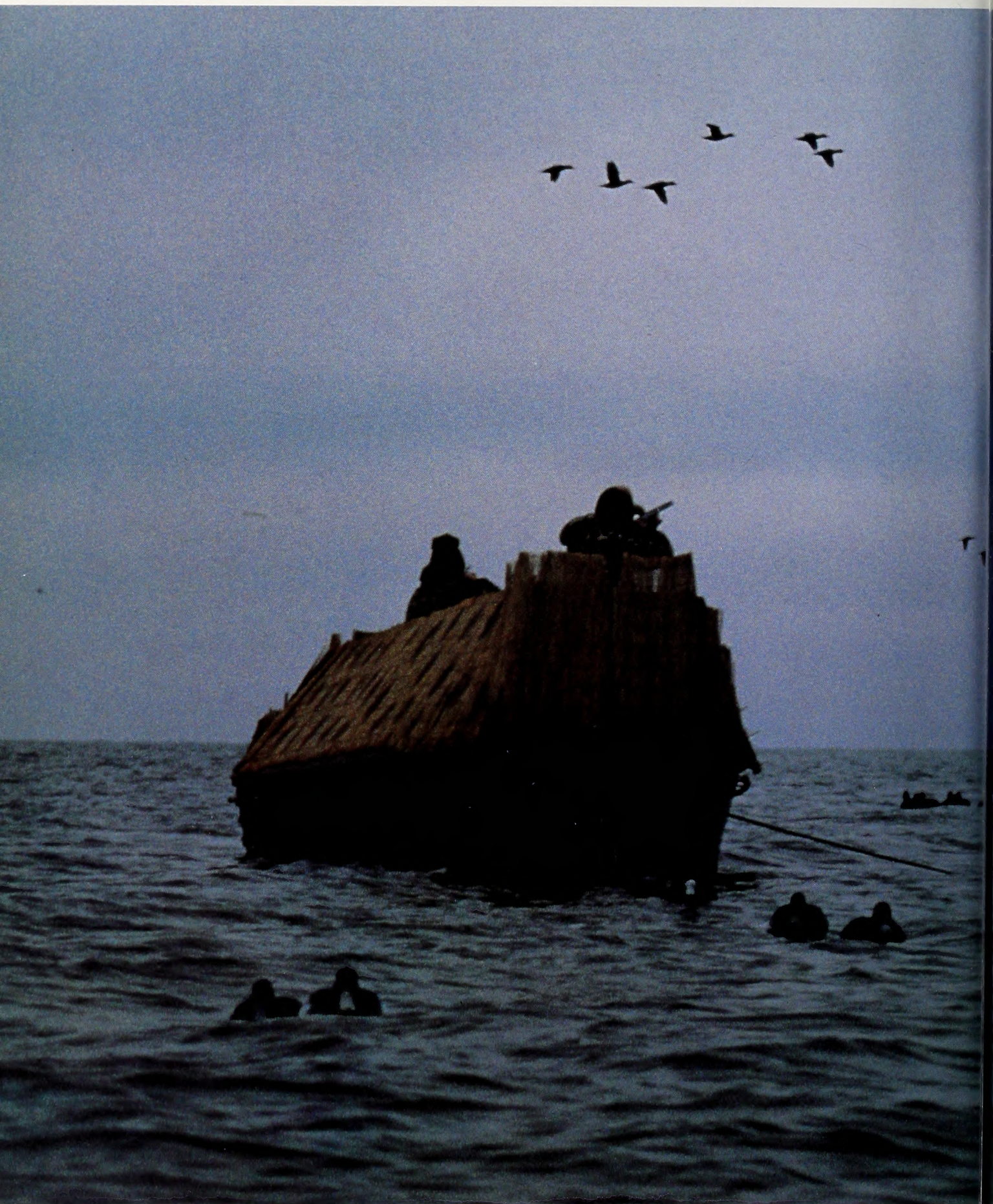
6) The baldpate, a puddle duck, is known as a "poacher" because of its habit of stealing food from diving ducks like canvasbacks.

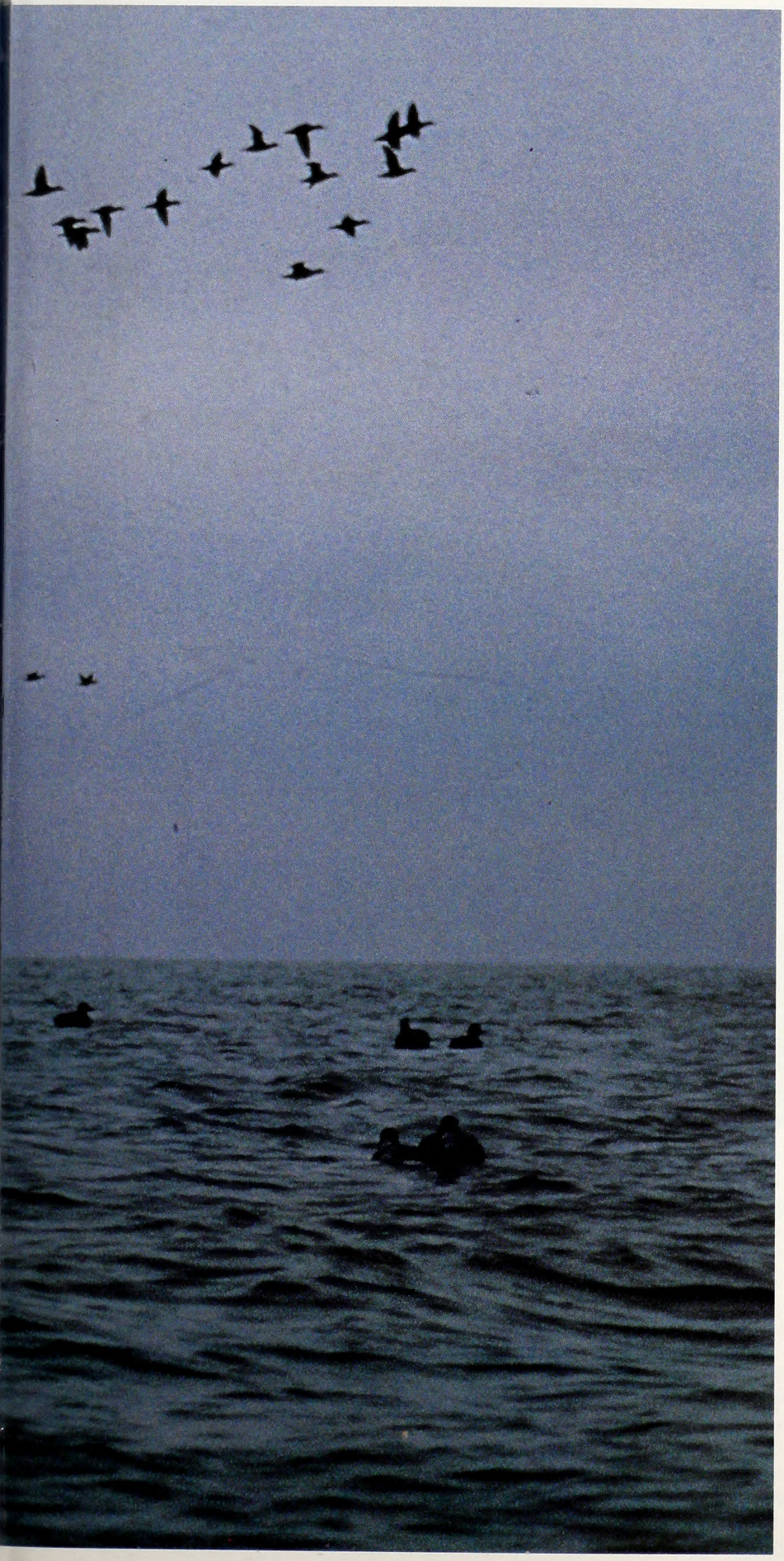
7) Weighing about 14 ounces, the green-winged teal is our smallest duck. Our largest is the white-winged scoter, weighing an average of 3 1/2 pounds.

8) There are about 115 species of ducks worldwide. North Carolina is visited by 24 duck species.

9) The best down for sleeping bags and winter clothing comes from the eider duck.

10) The first duck to migrate to North Carolina each fall is the blue-winged teal; the last generally is the scaup.





I'll Take Sea Ducks!

Most hunters ignore them, but sea ducks are abundant and found on public water.

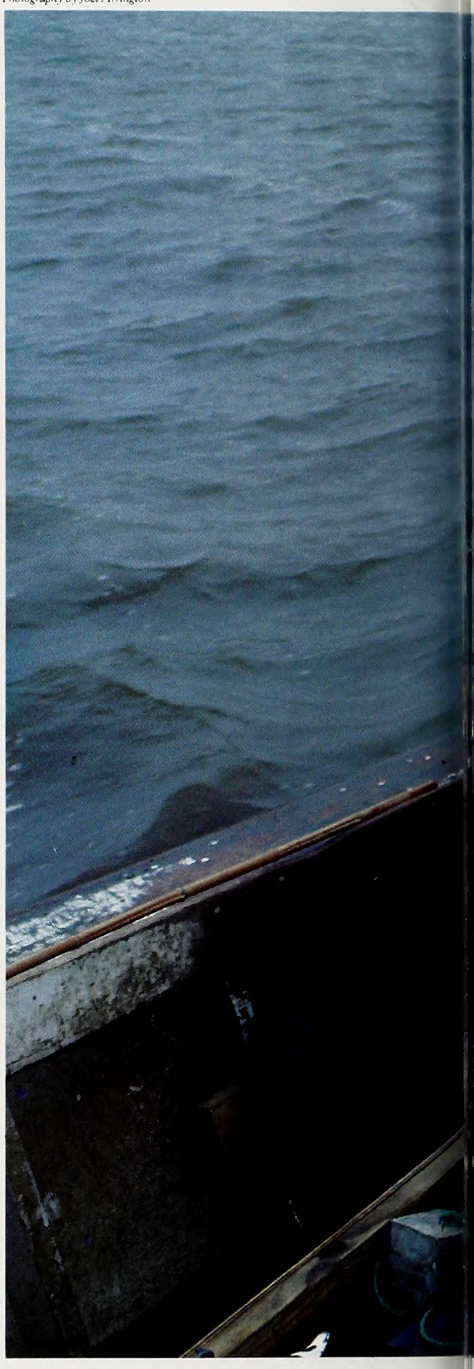
by Joel Arrington

Scoters get no respect. You don't see needlepoint scoters on any pillows like mallards or Canada geese, and they are seldom subjects of wildlife art. Most hunters couldn't identify one in hand. The highlight of scoter cultural history was when a pair of white-wings was depicted on the federal duck stamp in 1969.

North Carolina hunters especially ignore them, along with oldsquaws which, collectively with eiders and scoters and a few other species, we refer to as sea ducks. But they are not just in the ocean. In winter, sea ducks move into western Pamlico Sound, far up the mouths of the Neuse and Pamlico rivers, and are fairly common in the sounds south of Cape Lookout. The birds decoy easily, they are plentiful, so bag limits are liberal, and the season is long. Despite all this, they are grossly under shot. Most hunters are surprised to learn they are good to eat.

We get very few eiders or harlequins in North Carolina, so when we talk about sea ducks, we are talking mostly about three species of scoters and the oldsquaw. There are surf, black and white-winged scoters, but the latter are not nearly as common here as the other two, and oldsquaws are not as common as scoters. You get mostly surf and black scoters in northern Pamlico Sound where I have been hunting lately,

Photography by Joel Arrington



It takes a good number of decoys to attract sea ducks, and most guides set them out in strings so that they're easier to put out and take up. Sea ducks aren't dumb, either. For good results, your decoys must look like the sea duck species you're hunting.

but anything can show up.

The sea ducks are not hard to identify once you've seen them. Oldsquaws are black and white. The only thing you are likely to confuse them with is the drake buffelhead, which is smaller and does not have the oldsquaw's pointed tail. Oldsquaws resemble pintails in body shape, but lack their long necks. Scoters are predominately black birds except for the surf scoter's white patches on its forehead and back of the head, the black scoter's yellow dab at the base of the bill, and the white-wing's white wing patches. All the scoters have large, powerful bills, but the drake surf scoter's is a remarkably bright and colorful one. Most of the time, these birds fly low over the water and scoters are likely to form undulating lines; oldsquaws fly quite fast with rapid wingbeats in ever changing flocks.

All these game birds breed in Canada and Alaska and in the high arctic around the globe. The white-winged scoter has three races, the Asian, European and North American, and ours breeds in northwestern Canada and Alaska. Black scoter nesting areas are something of an enigma, but the American race nests in remote areas of the Canadian and Alaskan tundra.

Sea ducks winter along both coasts of North America. North Carolina is about as far south as oldsquaws go, but black scoters continue in large numbers as far south on the Atlantic Coast as Georgia. Curiously, they tend to winter far north (many in Alaska) on the Pacific Coast. Surf scoters are much more abundant in the west than along the Atlantic in winter, and most of the eastern birds winter between Barnegat Bay and Norfolk. Nevertheless, there is a good number in Pamlico Sound. Although about half the sea ducks that winter along the Atlantic Coast are white-wings, they seem to be the least populous of the scoters in Pamlico Sound.

Despite the fact that these birds eat mostly marine animals — crustaceans like crabs, shrimp, and barnacles and mollusks like mussels and clams — I was surprised to find them good to eat. Admittedly, I have only tried the breast filets, and only birds from Pamlico Sound (ocean ducks may taste different), but they are excellent, in my opinion, and I have provided a recipe elsewhere in these pages.

There are at least two nice things about sea duck hunting. One is that it all takes place on public water. There are no private sea duck blinds. The other is that it's best on calm days. Since almost all shooting is done from boat blinds, it is dangerous to impossible to hunt when the wind is up. If it's windy and you have to hug a lee shore, you will not be able to set up where sea ducks trade back and forth between rafts and feeding areas. You will need to get well away from shore to get into the thickest traffic (and, indeed, the law requires you to be at least 800 yards from land). A good location may be determined after daylight as you motor offshore and intersect flight

Sauteed Scoter Breast With Scallions

Pound the filets on a board with a tenderizer or back of a heavy knife or edge of a saucer. Do not salt if you use canned stock as it has salt. Pepper generously, dredge in flour and saute in the butter or oil over medium-high heat in a heavy iron skillet for five to eight minutes on a side or until juices run pink, longer for well done. Remember that filets will toughen the longer you cook them. Remove to a warmed serving platter, saute the scallions about five minutes in the pan drippings until soft, and add the stock. Increase heat to high and reduce the stock to syrup, stirring up bits from the bottom. Pour over filets, sprinkle with parsley and serve two per person with wild or brown rice.

- *six scoter breast filets*
- *flour*
- *pepper*
- *six ounces of beef stock*
- *two or three scallions, chopped, with some of the green part*
- *butter or oil*
- *chopped parsley*

patterns. You may want to move again if you see much activity farther offshore.

A good boat for a blind is a large, stable, yet open craft of about 20 feet in length, but any old boat can be built up into a blind. You need plywood sides to cut the wind, and these panels should be covered with reeds or be otherwise bushed. Throw in a couple of concrete blocks for seats and a few boat cushions and you are in business. This blind may be towed and anchored in position and tended by your partner from the towing boat anchored some distance away, or it may be self powered.

Sea ducks are very species specific when it comes to decoys. Oldsquaws will go to

Black scoters (with yellow dabs at base of bill) and surf scoters (with white head patches) are among the most common of the sea ducks found in North Carolina. Scoters are our largest ducks, averaging 3 1/2 pounds.

oldsquaw decoys, scoters to scoters, so it is well to have some decoys that look like sea ducks. The other great possibility when hunting sea ducks is scaup, so we usually set decoy spreads to include scoters, oldsquaws and scaup. The oldsquaws are made from pintail decoys that have been sprayed black, then painted white on the wings and neck. Scoters are diving duck decoys sprayed black, then dabbed with orange on the bill for a black scoter, with white on the head for a surf scoter.

You can try putting scaup decoys on one side of your boat, scoters on the other, and oldsquaws in between and off one end. All these can be strings of decoys on a single line. To increase the size of your set, you may add strings of bleach bottles which have been sprayed black.

An unlikely, but effective, trick is flagging. Scoters fly low over the water, so those passing some distance away may not see your set. You can wave a black flag (we made some from plastic leaf bags) just briefly and they will frequently turn and fly directly to you. Often they will pick up altitude when you wave your flag so they can see your set better.

Scoters that are warily skirting the edge of your decoys may sometimes be made to feel more secure if you call. There are effective diving duck calls on the market, and you can make a creditable sound on a mallard call, but, in my experience, calling is the least important aspect of attracting sea ducks.

In warm winters, such as we had last season, there are few new birds moving into Pamlico Sound as the season progresses, so you end up working the same birds over and over. They then become more resistant to your deceptions and it becomes increasingly important to do everything right. New birds can be easy to decoy.

These are good sized birds, requiring #4 or larger shot in lead, #2 or larger in steel. I also like to take #8 shot for cripples. Scoters are prone to dive when hurt, so you should stay on them when they fall and continue shooting them as long as their heads are up.

If you are starting from scratch, it can be quite an expense to get set up for scoters. If you want to see what the sport is about, you may hire a guide. One lodge that has had considerable experience with it is Hester's Mattamuskeet Inn in Fairfield. Guides tow boat blinds behind a trawler to positions in northern Pamlico Sound from Germantown to Judith Island. Daily rates with room run around $100 per person, depending on the size of your party.⊠

Is Your Dog Healthy?

by Mike Gaddis

Good kennel care and a knowledge of common ills can keep your canine hunting happily.

She was my first true love. She was four and I was six. Though she belonged to another, she was my Lady.

Lady was a 13-inch wisp of beagle. She was owned by a friend of my father and kenneled on our farm. At first she was only one of the nine that made up the pack. Then she began begging my notice, dancing at the fence on those dainty, white stocking feet, and whining softly. She was irresistible, and I began finding excuses to keep her company. Before I really knew it, I was head over heels into an affair, the kind that's meant to last forever.

But it ended less than a year after it began, in a way my youthful mind had no ability to comprehend. Lady died of distemper, in ugly convulsions that robbed her of all beauty and dignity.

It shouldn't have happened. I realized that later. Lady, along with the rest, was carelessly attended and poorly kenneled. It's hard to lay blame. It was the way most folks kept dogs. It was more ignorance than neglect. But kennels were too small, rarely cleaned, and housing usually inadequate.

Field dogs deserve far better. The things we ask them to do are simply incredible! Like running for hours in a freezing rain on a diet that sustains bodyfat at the meager level of a marathon runner, or making a 300-yard retrieve and returning to sit for hours in a cramped, wet corner of a drafty duck blind, or living off the land until rounded up two or three days after an all-night hunt.

For a dog to rebound from such demands and maintain a healthy and happy condition, good kennel care is imperative.

The goal of anyone who keeps field dogs should be to maintain them in a condition which allows optimum performance. Dogs can suffer a good bit of abuse and still be capable of astounding feats by human measurement, but not *optimum* performance. Only an animal at peak condition is capable of a maximum effort. Field trialing, with its demand for the best, drives that point home in no uncertain terms. And while most hunters do not have a need for performance at field-trial levels, it is shortsighted to ignore what it teaches when field success depends much on the staying abilities of a canine companion.

For dogs to perform optimally, they must be healthy and happy. Pay a lot of attention to the "happy" in that line because many kennel owners don't. And it is a major oversight, perhaps the one overlooked most often. Dogs have both physical and mental needs. They experience highs and lows much as we do, and they can suffer detrimentally from mental stress. A lot of attention is generally given to the physical side of the equation, but not enough to the psychological side.

Dr. Alvin Nitchman of Alabama has been asked many times what the key factors are which have contributed to his success as an amateur trainer of pointing dogs. Invariably he places great emphasis on the need for relating to a dog psychologically, for "getting in his head", through both kennel attention and companionship. He's a man worth listening to. At last count, his dogs have won over 35 championships in competition of the highest order. He's done his share of take-it-as-it-comes bird hunting too, and started out that way.

With both physical and psychological needs in mind, the place to begin is with proper kenneling.

THE KENNEL

Since so much of a dog's life is spent in the enclosure which serves as the home kennel, a good deal of thought and care should be invested in its construction. Keeping some basic things in mind, there's a lot of flexibility. Generally, a dog lot should be built over well-drained soil, receive the full sun for a half day or more, and have more length than width. The greater length encourages exercise and allows a longer, uninterrupted distance for it. The area enclosed should be of ample size. For one or two dogs, something on the order of 12 feet by 24 feet is advisable. If I had the space and could afford it, I'd seriously consider 15 x 35. You can go with smaller, particularly if you take your dogs out often or have a fenced-in yard or exercise area. The kennels at the Purina Research Center, for instance, are 5 x 25. Modular commercial kennels are offered as small as 8 x 10. But for six to eight months of the year, most field dogs must endure long periods of confinement. A little extra space means much in

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assuring some stretching room and avoiding depression and boredom. It has a side advantage. The more conditioning you get in the kennel, the further ahead you are come hunting season.

The shape most commonly used is the rectangle, but it is not the only possibility. For efficiency, it would be hard to beat the kennel design at the Sandhills Field Trial Facility at Hoffman, N.C. Several individual enclosures are combined into a circle. Each enclosure is shaped like a pie slice with the point toward the center of the circle, where a water source is located. The entrance to each enclosure also opens to the center. This arrangement makes it very easy to feed, water, and clean with few wasted steps. If you have several dogs, you might consider it.

The most common substrate for the kennel floor is dirt. It comes free, has natural cleansing properties that with a little help maintain adequate sanitation, and is easy on feet. If well-drained, it is generally satisfactory. However, even the best dirt lots get sloppy occasionally under active paws in the freeze and thaw of long wet sieges during winter. Concrete will solve that; it is very stable, and makes cleaning easy. Its possible contribution to foot and leg disorders has been much debated, but seems inconclusive. The biggest hesitation for most of us with modest means is its expense. If you use it, it should have a brushed surface. Gravel, meaning something like No. 78M stone, is a good alternative. It is much cheaper, offers good conditioning for pads, and stays dry on top in wet weather. With stirring and occasional disinfecting, it remains acceptably clean. A base of about 4 inches should be maintained.

Living in sanitary conditions enables a dog to keep its natural immunity to disease at a high level. The most important thing you can do in this regard is to remove droppings from the kennel run daily, especially during periods of inclement weather and minimal sunshine. Once every week or two, dirt and gravel lots should be raked, limed, and disinfected. Clorox or Lysol is a suitable disinfectant, in a ratio of about three-fourths cup per gallon of water. Putting it in a pump-up sprayer makes the job quick and easy. Concrete can be washed with detergent and then similarly treated.

Housing for outdoor dogs should be big enough for comfort, but small enough to retain body heat in cold weather. Common mistakes are making the doorway too big and having too much ceiling space. It should be draft-free, off the ground a good 12 inches to 18 inches, and facing away from prevailing winds. Soft bedding, like coastal bermuda hay or cedar shavings, will keep it snug during winter. Shape matters little and it does not have to be expensive. In the past few years, 50 gallon wooden whisky barrels have been in common supply through retail outlets like grocery stores and building supply firms. These make excellent houses when mounted on wood or metal supports and cost less than $15 apiece. An entry opening can be cut in one end and reinforced with cross braces and you're in business. It can't be much simpler. Admittedly they smell a little high at first, though my dogs haven't minded and seem to prefer those from Seagram's. They always have been picky.

NUTRITION

No dog can be truly healthy without sound nutrition.

The number of well-balanced, high-quality commercial dog foods on the contemporary market makes a long discussion of nutrition factors needless. The well-known name brands like Purina, Wayne, and Gaines are backed by ardent quality control and research. Their packaged dry foods can be fed with confidence. Hard-working dogs need a diet high in digestible protein to build and maintain body tissues, particularly muscle mass. Nearly all the dog foods that make the claim of "high protein" are formulated at about 26 percent, meaning approximately 26 percent of the total product weight is crude protein. This is determined by laboratory assay and not by feeding tests conducted with dogs. Therefore, it may not all be available to the dog in a digestible form. All protein sources are not of equal quality. Labels on dog foods should be studied carefully and compared. Generally in a good food, you're looking for an animal source like meat and bone meal along with a varied balance of quality vegetable sources which include wheat and soybean meal. Personally, I am wary of dog foods which list poultry "by-products" or beef "by-products" as prominent ingredients. That can mean a lot of things, and when they're accompanied by a come-on price I'm suspicious about how much of the 26 percent is digestible. Nevertheless, you may wonder occasionally whether the premium you're paying for the leading brands is justified. The only thing I can offer is that of those who have made their marks with top-performance dogs I have yet to meet anyone who compromises.

High protein does impose a greater load on the kidneys. Because of this, some owners feed sustenance protein levels of around 18 percent to 21 percent during the off-season as a precaution against early mortality from kidney failure. This is a good idea, especially with older dogs.

Research has shown that during the hunting season dogs need a 20-30 percent increase in food intake in order to maintain top condition. Equally important to adequate diet is making certain your dogs have a constant supply of fresh water.

DISEASES

Basic kennel care is incomplete without a program of innoculation and preventive measures against life-threatening diseases. The mobility of field dogs greatly increases their exposure opportunity and makes this particularly important.

Dread diseases in the canine world are viral or bacterial in origin. The common viral diseases are distemper, infectious canine hepatitis, adenovirus type 2, parainfluenza, parvovirus, and rabies. The bacterial group includes leptospirosis and brucellosis. Brucellosis is the canine counterpart of the human venereal diseases. All can be deadly or debilitating. The viral diseases are highly contagious and extremely virulent and a dog which contracts one of them will often suffer lasting physical or neurological impairment even though treatment may be life-saving. This is why preventive innoculation is so important.

Distemper is one of the oldest diseases affecting dogs, and is easier to prevent than cure. It is difficult to treat because there are usually secondary bacterial infections that accompany the virus. It can result in severe intestinal disorders with diarrhea and vomiting, heavy nose and eye discharges, and in the final stages, neurological effects including twitching and convulsions, and death. There is a common myth that recovery from distemper gives a dog a lifetime immunity from reinfection. Veterinary research has proven this to be untrue; many dogs have indeed become victims of a second bout.

Adenovirus and parainfluenza are the major agents for canine hepatitis and a generic group of canine respiratory diseases. There are two types of adenoviruses. Adenovirus type 1 causes hepatitis, which in severe cases causes enlargement and inflammation of the liver. Adenovirus type 2 and parainfluenza have been strongly associated with tracheobronchitis, commonly called "kennel cough". Kennel cough can take several forms. In mild cases, it may only produce sneezing as with the common cold in humans. In serious cases, it can lead to pneumonia. It can remain virile in a kennel for as long as two years. If you're a fox or rabbit hunter with a sizeable pack, or if you kennel a number of dogs in close quarters for any reason, it should not be taken lightly. In addition to innoculating your own dogs, be wary of bringing in dogs of unknown

Illustrations by Walt Obman

background.

Parvovirus can easily serve as a case study of the epidemic nature of the viral-borne diseases, both in producing canine death and human pandemonium. Parvo virtually set the dog world on its ear, from owners to vets to research labs. It appeared suddenly, in the summer of 1978, a new canine disease that was contagious and lethal. One year later, it was a worldwide epidemic, producing unbelievable mortality.

When the media began reporting it to the public, dog owners became frantic and besieged veterinarians demanding protection. The vets were up a tree like everyone else in the early going. At first no specific vaccine was available. The research labs burned midnight oil and some of the best early research was done at Cornell University. A strong similarity between the new virus and FPL, or "cat distemper", was discerned through electron microscopy and veterinarians began administering FPL vaccines to dogs. In the scramble to meet the overwhelming demand, the FPL vaccine ran short and in some cases a mink enteritis derivative was employed.

There was a lot of controversy over the degree of protection afforded and for how long. Also, there was a nagging question about side effects. Even the most conscientious of dog owners and vets were uncertain where to turn. The search for a better and more specific vaccine was on, one of canine origin. Rumors began to circulate that one had been developed. I remember making calls all over the country trying to find a source, because it was some time before it was available locally. Meanwhile, dogs continued to die at an alarming rate. Many owners lost dogs to Parvo and never knew why. Field dogs, being highly mobile, were particularly susceptible.

Finally, in 1981, the first canine-origin vaccine became generally attainable, though it was still in short supply. The degree of protection was enhanced, but it was an inactivated, or "killed cell" vaccine, and researchers continued to hope for the development of a modified live-virus vaccine with potential for longer-lasting immunity and greater levels of protection. Only recently has such a vaccine been realized, and better supplies combined with elevated public awareness, will hopefully reduce Parvo to a manageable threat. However, already there are suspicions that new strains of Parvo are emerging and that Parvo vaccines are somehow interfering with distemper immunity. This needs further confirmation, but points up the endless complexity of the thing.

Parvo can produce infections in the heart, intestinal lining, lymphoid tissue, and bone marrow. As with most of the viral diseases, treatment is limited to controlling symptoms of the disease, and does not affect the causative virus. It can readily be transmitted to another dog. Again, preventive immunity is the key.

Except for rabies, which requires a separate shot, dogs can now be protected against Parvo and the other dread diseases through a single, convenient innoculation. This has been enabled by the development of combination vaccines. These are supplied by several laboratories, and are often referred to generically as DHLP-CPV. This stands for Distemper, Hepatitis, Leptospirosis, Parainfluenza, and Canine ParvoVirus. The vaccine you use should be a modified live-virus type, of canine-cell origin. Your vet can help you with this.

For the rare, grown dog that hasn't been previously innoculated, two doses are recommended two to four weeks apart. Thereafter, the same vaccine is used as an annual booster. Puppies require a different regimen, which should be closely followed. During their first year they are highly vulnerable to disease.

Dr. Dan Allen of the Boulevard Animal Hospital in Raleigh offers the following.

"We like to give pups three innoculations of DHLP-CPV," he says, "the first at six to seven weeks, another at nine to 10 weeks, and the last one at 14 weeks. The dose each time is the same as for grown dogs, because vaccines are based on the amount it takes to produce an immunity rather than weight or size, and this is the same for dogs or puppies.

"The reason for this sequence of shots is that the temporary protection the pups get through the first milk of the mother neutralizes vaccine virus. So vaccination is ineffective until the pups lose the maternal antibodies. When this happens varies depending on the early nursing success of an individual pup. But for some, it will be 12 weeks or longer. That's why it's important not to give the last shot before 14 weeks. For the same reason, we come back with another Parvo shot at four months."

PARASITES

Parasites are the other constant plague of dogkind. Some, like the flea, are perpetually aggravating and irritating; others, like heartworms, can be quite fatal if left unattended. They separate into two forms, ex-

COMMON INTERNAL PARASITES WHICH THREATEN FIELD DOGS

Parasite	Method Of Transmission	Symptoms*
Roundworms	Ingestion of infected feces, soil, other materials; larvae can pass from pregnant female to unborn pups	Diarrhea; dull coat; anemia; coughing; enlargement of abdomen
Hookworms	Ingesting larvae from infected food, water; skin penetration; larvae transmitted through dam's milk	Anemia; dehydration; weakness and listlessness; blood in feces; acute fecal blood loss in pups
Tapeworms	Ingestion of fleas; or rodents, particularly rabbits	Whitish, rice-like segments in the feces; dull coat, itchy skin; unthriftiness; loss of weight
Whipworms	Ingestion of infective eggs from hair coat, in food or water	Dehydration; bloody diarrhea; anemia; normal bowel movement until near completion, then discharge of mucus or blood
Heartworms	Mosquito bites	Rapid tiring; coughing; anemia; scratching; fainting spells. Light infestations before worms increase may not cause symptoms.

* Symptoms described can be followed as a general guide, but fecal samples and blood samples should be taken periodically for veterinary diagnosis and confirmation.

COMMON CANINE DISEASES & THEIR SYMPTOMS*

Disease	Agent	Early Symptoms
Distemper	Viral	Fever, temp. 103-104; eyes light-sensitive with watery discharge; loss of appetite and listlessness
Hepatitis	Viral, Adenovirus	Fever, even higher than distemper; inflammation of eyes and throat; loss of appetite
Kennel Cough	Viral, Adenovirus Parainfluenza	Occasional sneezing in mild cases; persistent dry, hacking cough when more severe; temperature and appetite may be normal
Parvovirus	Viral	Depression; loss of appetite; vomiting; fever; rank diarrhea. *Rapidly* serious.
Leptospirosis	Bacterial	Fever, usually with chills, vomiting
Brucellosis	Bacterial	Fever; loss of appetite
Rabies	Viral	Radical change in normal disposition, friendly to irritable, loving to shy, etc.

Note: Normal temperature for the dog is 100-01 degrees F.

* While the symptoms described can be followed as a general guide, it must be realized that some variance can occur in individual cases. In questionable instances, seek veterinary advice.

ternal and internal. The most troublesome external parasites are the flea, tick, mosquito, and dog louse. The most dangerous internal parasites are the roundworm, hookworm, tapeworm, whipworm, and heartworm. Each has a life cycle which must be basically understood for its control, and it must also be realized that some of the internal parasites utilize external parasites as hosts in completing their life cycles. Fleas are immediate hosts for tapeworms, and the mosquito transmits heartworms.

If one knew nothing at all about the flea save the variety of commercial products which are offered for its control, it would be judged a formidable adversary by this alone. Anyone who has been engaged in the direct and never-ending battle against the varmint knows this firsthand! Flea infestations have been heavy in North Carolina this summer due largely to a mild, wet winter. The heat of summer and thin hair coats leave dogs more susceptible to their ravages. Like all the external parasites, they are looking for a blood meal. Their constant biting and the dog's scratching can lead to more severe skin problems.

Control depends on breaking the life cycle. A female flea deposits as many as 500 eggs in a lifetime in the dog's haircoat and bedding and in any crack or crevice the kennel offers. The eggs become larvae and then go into cocoons. The adult flea emerges from cocoon in a few weeks or may lay dormant for a year if conditions are not right. It is not hard to reason from this why you find fleas on a dog a few days after you thought you killed them all. Control depends on killing eggs, larvae, and adult. It is easy to kill adult fleas on the dog. Just use one of the many powders, sprays, dips, collars, or shampoos available. You can even discuss

the use of a flea pill with your vet. To kill the eggs and larvae, roll up your sleeves! It's an ongoing campaign of at least several weeks, and you have to keep guards posted after that. Turn everything upside down in the kennel run and treat bedding, house, and every nook and cranny in the kennel. In my own kennel, we've had good luck with a combination of Sevin dust and Malathion spray. Use 10 percent Sevin dust, fleas now scoff at the 5 percent formulation. Sprinkle the Sevin dust in the bedding. You can also use it on the dogs. However, I would avoid using it more frequently than every two weeks. Mix the Malathion at a ratio of 5 ounces to a gallon of water and bring the pump-up sprayer into play again. Try to spray every part of the kennel run. Repeat this once a week for about three weeks. Remove the dogs while you do this, and wait until the spray has dried before returning them. Remember that all insecticides are potentially dangerous to you and the dogs, and take precautions accordingly.

Ticks are not a big problem for dogs that remain confined to the kennel during warm weather. But if dogs are out at all, they will pick them up and it is almost impossible to prevent this. They can be removed by hand, though it is advisable to use tweezers. Hydrogen peroxide can then be applied as an antiseptic. Or the dog can be immersed once a week in an insecticidal dip. Ear mites can be killed by direct application of a specific insecticide into the ear. The Sevin dust takes care of lice.

The common dog worms are the roundworm, hookworm, tapeworm, and whipworm. They cause anemia, loss of weight, and sometimes death. The best, single preventive measure you can take is to pick up and remove kennel droppings daily. The life cycle of all depend to strong extent on fecal material. A saturated solution of table salt or borax and water can be sprayed on the kennel floor as an aid in killing hookworm larvae. Even with the best efforts at prevention, there will be an occasional need for treatment.

The need for treatment should be verified by your veterinarian through examination of a stool sample. This should be done each six months and followed by treatment only if necessary. There are products sold through supply houses like Happy Jack at Snow Hill or through your vet with which you can design your own treatment plan, or you can follow the treatment plan prescribed by your veterinarian. Most worm treatments are given orally by capsule or as a powder on the food, some by injection but only by a veterinarian.

Most of us with a number of dogs and rurally located have to be fairly self-reliant. It is simply impractical and expensive to load up 10 to 20 dogs and go to the vet. It is possible in some cases to work out a satisfactory kennel-visit schedule with a good vet, but I believe you can carry out a satisfactory treatment program of your own if you remember a few things and are humble enough to seek professional help when you really need it.

The first thing to accept is that one product won't do it all. Some are specific for roundworms only, some for rounds and hooks, and very few for rounds, hooks, and tapes, and to my knowledge, none at present for rounds, hooks, tapes, and whips. Whipworms are insidious and can load up a dog in a hurry. If you neglect them, you'll find out. For a basic program on a six month's schedule, I have used Happy Jack's Trivermicide satisfactorily for rounds, hooks, and tapes, along with a whipworm treatment when needed which can be purchased through a vet. The second thing you have to accept is that one treatment rarely suffices. It usually needs to be followed by a second at a time interval recommended for the product you use, generally in one to three weeks. Finally, take a stool sample to your vet twice a year to see if you're getting the job done.

Heartworms are long slender worms that can measure up to a foot in length, and are most frequently found in the right ventricle of the heart and in a large adjacent blood vessels. The lungs, liver, and kidneys can also be affected. A heavy infestation in a dog causes shortness of breath, weakness, nervousness, and loss of stamina. Heartworms can live several years and an adult female can produce millions of young worms called microfilariae. Microfilariae cannot develop into adults without the aid of an intermediate host. The mosquito serves that role. The life cycle begins when a female mosquito bites and infected dog and ingests microfilariae. These incubate in the mosquito's body for up to 30 days and then enter its saliva. At this stage they are infective. When infective larvae in the mosquito's saliva are deposited under a dog's skin, the disease is transmitted. The larvae will reach maturity in five or six months and begin reproduction.

Heartworm infestations are common in North Carolina, particularly from Raleigh east, where mosquitos are prevalent. Oral drugs are available which afford prevention of the disease by killing microfilariae. These must be administered daily and there is a choice between tablet, powder, and liquid. Styrid Caracide is a liquid form which also aids in the control of roundworms and hookworms. It is unique in this regard, but also has a bitter taste some dogs refuse. You can cut the bitterness with, oddly enough, a good slug of garlic juice. We have done this for years and not a dog in the kennel refuses it. You often see mosquitos on unseasonal days in winter, so we give the preventive year round. Any of these preventive drugs are for non-infested dogs only. They can be very dangerous to dogs that carry microfilariae or adult worms. A blood test is used to determine the presence of microfilariae and should be conducted by a veterinarian prior to their use.

In addition to a conscientious program of innoculation and prevention, every dog owner should learn the early symptoms of canine diseases and internal parasites and watch for these closely. Excellent references on the care of dogs and kennel management which will supplement the scope of this article are *Your Dog, His Health and Happiness,* by Louis L. Vine, D.V.M., and the *Dog Owner's Home Veterinary Handbook,* by Delbert G. Carlson, D.V.M. and James M. Giffin, M.D.

Once comfortable with your preventive efforts, the best added insurance for keeping a dog healthy and happy is to spend a little time with him each day. If you have a kennel full, get around to all of them over the course of a week or so. Make it an informal examination with a lot of attention. Note disposition, general condition, and alertness. If any change in normal character or behavior is perceived which lasts for more than a day or two, consult your vet.

It's the least you can do for a member of the family.

Bird Watching Comes Of Age

Roger Tory Peterson is the best-known of this nation's 20 million bird watchers whose pastime is a half-billion dollar investment.

by Curtis Wooten

"By some, bird watching is regarded as a mild paralysis of the central nervous system, which can be cured only by rising at dawn and sitting in a bog. Others regard it as a harmless occupation of children, into which maiden aunts may sometimes relapse."

—Joseph Hickey,
A Guide To Bird Watching (1943).

Curtis Wooten

Rising against the chill dawn of Lake Mattamuskeet, three whistling swans epitomize the beauty, grace and drama of birds. Birdwatchers will keep a vigil along a winter beach to experience such moments (above), but they need go no further than their feeders to enjoy the mystery of birds.

Joseph Hickey's tongue-in-cheek picture of bird watching as the occupation of children and little old ladies is one that, unfortunately, has clung to the activity for decades. It's a picture that's changing.

Today active birders include royalty such as Prince Philip of England, head of the World Wildlife Fund, and Prince Bernhard of the Netherlands. You can even see a pair of bird watchers featured in a television commercial aired in prime time. A.U.S. Fish and Wildlife Service study concludes that bird watching may well become the most widely accepted outdoor activity in North America. There are already over 20 million bird watchers in the United States, and they spend nearly a half billion dollars annually on bird seed, bird books and binoculars!

One well-known birder offers this explanation: "I think the basic appeal is that birds are probably the most vivid expression of life," says Roger Tory Peterson. "They are very incisive in their movements; they have wings and can go where they want on a moment's notice; and in a sense they symbolize freedom and mobility. Anyone who is interested in life and the natural world tends to watch birds."

Peterson is the author-illustrator of *A Field Guide to the Birds*, a book which, when first published in 1934, brought easy bird identification within reach of millions of people. Since then over 4 million copies of his Field Guide have been sold, and Peterson has become the dean of bird watchers in North America and much of the rest of the world.

There are numerous appealing aspects of bird watching. It is an activity that can be enjoyed from early childhood into old age; it can be done alone or with others, at any time of the year, day or night, in cold, darkness or rain; it can be recreational or competitive; it takes its practitioners into beautifully remote places that they might not otherwise go; it can be as simple as listing the birds that frequent a backyard feeder or as challenging as conducting behaviorial studies and contributing to scientific journals. "Few who watch a bird through a binocular once, will lay those binoculars down for good," says Eloise Potter, one of the three authors of *Birds of the Carolinas*.

Almost everyone is a bird watcher, although some may be reluctant to admit it. It is a rare person who cannot identify and describe the habits and habitats of at least a couple of dozen birds. Most urban dwellers recognize the cardinal, blue jay, towhee, sparrow, starling, pigeon and mockingbird; farmers can readily identify the grackles, crows, blackbirds, cattle egrets and hawks that frequent their fields, and the waterfowl that settle on their ponds; fishermen know the herons, egrets, osprey and kingfisher; and the oystermen who work the coastal estuaries know the willets, sandpipers, plovers, and yellowlegs that work the mud flats at low tide.

Those who get bitten by the

Evening grosbeaks Leonard Lee Rue, III

"Looking for birds is often a solitary affair. You are alone with the meadow and the bordering woodland, the marsh and the wind-swept beach, with the chill of dawn, the piercing cold of the winter wind and the close heat of a summer bog ... But association with other human beings with whom reports of the hunt may be exchanged ... adds greatly to the rewards."

—Charlton Ogburn,
The Adventure of Birds.

bird-watching bug expand their knowledge of birds species by species. Many can identify 300 or more species, some by sound as well as by sight. "Anyone can do it," says Bob Kluttz, an active birder who lives in Charlotte. "If a person takes one new bird a week, or even one a month, and learns its identifying characteristics — its size, shape, color, special markings and the habitat in which it is normally found — in a relatively short time he or she would be considered an expert." Kluttz says many people would like to know more about the birds they see but are intimidated at the thought of trying to sort out the hundreds of species that are found in North Carolina. "Fortunately, you don't have to learn them all at once," Kluttz says. "You learn them one at a time — it's just a matter of patience and practice."

Kluttz recommends that a person interested in learning more about birds start with those in his or her back yard. "Buy a good field guide and obtain the best pair of binoculars you can afford and become familiar with the birds around your home first," he says. "From there, spread out to nearby woodlands, parks, marshes or similar habitats and learn the birds found there. Then when on vacation at the coast, in the mountains, or out of state you can work on the ones found there."

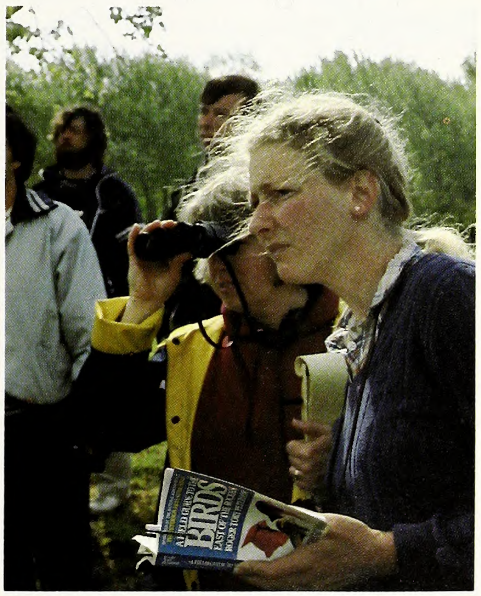
Kluttz also suggests joining a local bird club if there is one. "The clubs have programs and field trips, and experienced birders are great at helping the inexperienced develop confidence in their ability to identify unfamiliar birds."

Many bird watchers keep lists of the date, location and conditions under which they saw a new species for the first time. It is from this listing that the competitive aspect of bird watching has evolved. There are all kinds of lists: back yard lists, state lists, North American lists, world lists and life lists, to name a few. Birders compete to set new records for the most birds seen in a single minute, day, or year; from a single location; or in a lifetime, for instance. As with any type of competition, competitive birding can be lots of fun, but it draws some criticism. Wealthy birders have been known to charter jets to the farthest reaches of the continent to add a single new species to their lists, but some listers don't always have the best interests of the birds at heart. Courtship patterns have been interrupted by playing recorded mating calls in an effort to get rare birds to show themselves. Nests have been abandoned when birders moved in too close, too often. And in an infamous case a rare black rail was trampled into the mud of a California marsh by a group trying to flush it into view.

Fortunately, the abuses of competitive birding are the exception rather than the rule. "It's a great game," says Roger Tory

Prothonotary warbler Kay Frazier

Male indigo bunting Leonard Lee Rue, III



Coastal birdwatchers Jane Rohling

White-breasted nuthatch Leonard Lee Rue, III

Yellow-bellied sapsucker Ted Dossett

Feeding Birds Effectively and Economically

Bird feeders in your yard can increase the numbers and kinds of birds that come there. They can also help you to learn to identify birds because you get to see them up close and often.

Bird feeding is easy. Scatter a bit of food on the ground and put up a feeder or two and you're in business. What kinds of feeders and where to place them? When do you feed birds, and what? Here are some tips.

Feeder designs vary widely based on the species of birds they attract or discourage, but they need not be complicated. A slightly hollowed out tree stump, a flat rock or a well cover are good feeders, or you can simply scatter food on the ground near cover in the same place from day to day. Additional platform feeders 2 to 4 feet off the ground may make your yard appealing to a wider variety of birds and protect them from predators. Those with covers and hoppers protect the food from the weather and eliminate the need to refill daily. And, some of the small hanging varieties, such as the Droll Yankee and satellite feeders, reduce competition and can be filled with specialty foods to draw in shy birds. Squirrels can be terrible pests, and some feeders are designed to foil their raids on the costly foods.

For greatest utilization feeders should be placed at various levels from ground up to second-story windows. They can be dispersed, too, some near the house and others some distance away. They should be generally within five feet of cover such as shrubs, hedges or thickets. And, for protection from harsh north winds, most should be placed on the south side of your house or be protected by windbreaks. For your enjoyment, all should be within sight of your windows.

Many who have fed birds for a number of years recommend that you begin putting out foods in October when birds are setting up their fall and winter feeding territories. Initially usage will probably be light, but as the weather worsens and natural foods become scarce, the numbers of birds and their visits will increase.

Once you begin your feeding program be sure to continue it, at least through the spring when natural foods become more abundant. The increased number of birds your feeders attract to the area can quickly deplete the natural foods that are available. If your feeding program were to stop, competition for food would be keen and some birds would be unable to sustain themselves against harsh weather.

There are two rules for buying bird foods: buy in bulk and buy each type of seed separately. You get a better produce at a lower price when you buy in 50 or 100 pound bags, and the smaller bags of mixed bird seed leave much to be desired. A study done by the U.S. Fish and Wildlife Service several years ago showed that many of the seeds found in most commercial mixes, such as flax, canary and rape seeds are rarely eaten by birds. It is the cereal grains — corn, wheat, oats, rice, millet, canary seeds and grain sorghums — that are the most important group of foods for backyard birds, while sunflower seeds and white proso millet are preferred by the widest variety.

When buying sunflower, get the black oil-type rather than the large striped variety. You get more seeds and fewer hulls. These seeds can be supplemented by a wide variety of kitchen leftovers. Squash, cantelope and watermelon seeds, stale bakery products, grits, cornbread and eggshells are all taken readily by a wide variety of birds. Fruits such as banana, apple, raisins and orange slices can also be used to attract specific species.

Suet is another high-energy food that appeals to a wide variety of birds, particularly the insect eaters. The best comes from the kidney region of beef and can generally be obtained free or inexpensively from your neighborhood butcher. Placed in a wire-mesh holder and attached to a tree or feeder, or cooked down with seeds added, it draws in birds you might not otherwise see at your feeders.

There is a great deal of information available on bird feeders and feeding. Some of the better books are *A Complete Guide to Bird Feeding* by John V. Dennis (Alfred A. Knopf, N.Y.); *How To Attract, House and Feed Birds* by Walter E. Schutz (Bruce Publishing Co., N.Y.); and *Songbirds in Your Garden* by Edwin E. Teale (Thomas Y. Crowell Co., N.Y.).

Peterson "but it's not my game, at least not my only one. I play it, but I'm not obsessed with it. I even resent it a little when it becomes an almost hostile do-or-die one-upsmanship." On the whole the growth of competitive birding has probably been beneficial. It has converted what has been viewed as a rather laid-back hobby into a competitive sport and in the process has added zest to bird watching.

Peterson says he is more interested in the behavior of birds, their ecology and esthetics. So it is with a large number of other bird watchers. Having mastered the skill of bird identification, some birders tire of the quest to add another species to their life list. Their interest often evolves into the study of bird behavior — migration, songs, species outside their normal range, individual mannerisms and the like.

Actually, there are several steps in the development of a bird watcher. The Winter 1980 issue of the Carolina Bird Club newsletter contained an evaluation of the different categories of bird watchers, and detailed their habits and skills. Though written tongue in cheek, the descriptions provide a good deal of insight to birders and bird watching.

Bird Watcher: A person who watches birds at home, on vacations and occasionally goes on a field trip led by someone else; may own a binocular and field guide; may keep a life list; feeds birds regularly.

Bird Student: A person who makes a serious attempt to develop skill in field identification of birds; takes numerous field trips; owns one or more field guides, a binocular and often a spotting scope; keeps a life list, reports sightings to state journal; may participate in bird counts; feeds birds.

Advanced Bird Student (a.k.a. birder): A person who has developed considerable skill in bird identification; owns numerous bird books; a binocular, and almost always a spotting scope; writes notes and papers for state and national journals; participates in bird counts, often as a compiler; leads field trips; usually has some special area of interest such as bird banding, bird photography, or the study of one species; cooperates with professionals in research

projects; may be a graduate or undergraduate student in biology or zoology; feeds birds regularly.

Backyard Birder: A bird student who doesn't waste time and gasoline chasing rare birds; usually is more interested in bird behavior than birds are; feeds birds regularly.

Avid Birder: A bird student, often an advanced bird student who will travel great distances to add new species to his life list, state list, North American list, or world list; owns all the latest bird books and the most expensive optical equipment; often uses taped bird calls to attract birds; knows field marks and calls of all rare species likely to occur in area; always finds at least one rare bird on every bird count; often spoils the fun of bird counts for bird watchers and bird students; usually is too busy going on field trips to write field notes about rare birds seen, feeds birds when not away on field trips.

Amateur Ornithologist: Advanced bird student who has published numerous notes and papers in scientific journals; cooperates with professional ornithologists; has own research projects; has lost field guides and life list; feeds birds regularly.

Professional Ornithologist: Advanced bird student who earns a living studying birds or teaching others how to study them; usually has a Ph.D.; has lost field guide and life list, often binoculars as well; exhibits great patience with bird watchers, bird students and birders of every stripe; may have spouse who feeds birds.

A total of 415 bird species — 80 percent of all the birds found in eastern North America — have been sighted and recorded in the Carolinas. Peterson shared some of his notions on the reasons for the diversity of birds found here. "Taking the eastern seaboard states, not thinking of the West or Texas, North Carolina has the greatest diversity of birds for this reason," he said. "You have the northern limit of a lot of southern birds on the coast and the southern limit of the more northern species. The outer Capes, Cape Hatteras, divide the colder waters of the North Atlantic from the warmer waters of the Gulf stream, so from the point of view of coastal birds, it's a great strategic area. Also, North Carolina has some of the best marshes and sand beaches to be found along the eastern seaboard. In addition, western North Carolina has the highest parts of the Appalachians, so there's that diversity from the really Canadian zone of the high Smokies to the more tropical zone of the southeastern part of the state. For the birder it's got more variety than any other state on the east coast."

Though bird watching is generally good in North Carolina year round, it's at its very best in the spring and fall when waves of migrants move to and through the state. Fall is a time of cold fronts which have prevailing north and northwesterly winds, and the migrants ride the tailwinds of these fronts southward. Often there is a massive buildup of birds on the coast because the northwesterly winds also push them eastward. The Outer Banks act as a natural funnel for land birds coming down the coast and birding there in the fall is often spectacular. At times it is possible to see thousands of shore birds of several species feeding on mud flats at low tide — such as those just south of the North Pond at Pea Island National Wildlife Refuge. The entire 70 mile stretch of barrier beach, marshes, sounds and inlets that make up the Cape Hatteras National Seashore and the Pea Island refuge offers excellent birding through the fall, winter and spring. Other coastal birding hotspots are Fort Macon, near Morehead City; Fort Fisher, near Wilmington; and the Mattamuskeet National Wildlife Refuge.

Lake Mattamuskeet has given Peterson his best Carolina birding experience — particularly the waterfowl. It is the winter home of thousands of whistling swans. Canada geese and ducks. Rails and the long legged waders — egrets and herons — inhabit the marshes, osprey and bald eagles patrol the skies and a variety of upland birds are attracted to the pine forests and cultivated lands nearby.

The Cape Point area, near Buxton, may be the best area to see pelagic (sea) birds. A major migratory route for many water birds lies just off the coast. Shearwaters, petrels, and occasionally a rare jaeger, as well as loons, scoters, grebes, and gannets can often be sighted.

The best time to see the largest variety of land birds in North Carolina is in the spring as migrants ride the tail winds of warm fronts northward. The spring wind patterns do not push birds to the coast as they do in the fall, so the passage of land birds is spectacular in the Piedmont and mountains. Warm and cold fronts alternate in the spring and often after a cold front the forests and thickets are filled with colorful transients, their migration temporarily stalled. It is at this time that birders flock to the mountains. Many return in the summer in hopes of spotting some of the rare nesters in the high mountain peaks. Above 4,500 feet you can find birds that are more commonly found in the northeastern United States and Canada — the golden crowned kinglet, the red breasted nuthatch and black-capped chickadee. Twenty-three species of warblers have been recorded nesting in the Smokies.

Bird watching is fun, and sometimes it takes the hobbyist on a life career.

Many bird watchers go beyond the identification and listing stages to make

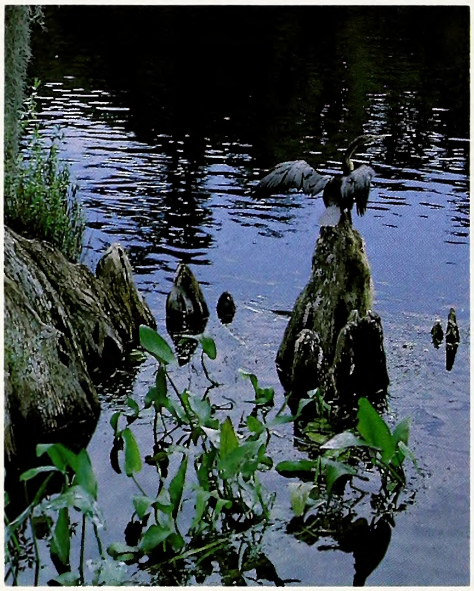
How much is it worth to help restore the golden eagle to North Carolina's mountains and the bald eagle to the Coastal Plain? Is it worth much to give a boost to the songbirds at your winter bird feeders?

Birdwatchers, sportsmen and all who enjoy the outdoors will have a chance to answer these questions for themselves this year. A recently enacted law creates a checkoff line on the State income-tax form by which citizens can donate a portion or all of their state income-tax refund to the Wildlife Commission's nongame and endangered species program.

The program comes at a critical time. The loss of federal funding in recent years has drained nongame and endangered species programs of much of their financial support. The tax checkoff now gives everyone the chance to contribute to management programs designed especially for nongame and endangered species.

So if seeing a brown pelican at the beach gives you a thrill, you might want to remember it when you're filling in your income tax forms this year. Checking off for nongame may be the one bright spot in your day!

Willet — Leonard Lee Rue, III



Anhinga — Joel Arrington

American egret — Joel Arrington

Carolina wrens — Jack Dermid

Ruffed grouse — Leonard Lee Rue, III

Snow geese Ken Taylor

valuable contributions to science, esthetics and conservation activitism. Amateur observers have made enormous contributions to the bank of knowledge about our bird populations, migration, distribution, breeding, biology and other aspects of their lives. "The person who watches birds inevitably becomes an environmentalist," Peterson says. "Because birds are so sensitive to changes, anyone who watches them and sees things happening to them knows that what affects them might ultimately affect himself."

But that's probably not the reason most people watch birds. For the backyard birders who make up the majority of bird watchers birding is merely a pleasant hobby that provides insight to the natural world.

The English naturalist Thomas Nuxley once wrote: "To a person uninstructed in natural history, a country stroll is a walk through a gallery filled with wonderful works of art, nine-tenths of which have their faces turned to the wall." Bird watchers are among the lucky ones who strive to unveil some of those works of Nature's art.

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Want to learn more about bird watching? Check out some of the following references from your local library. *Watching Birds: an introduction to Ornithology,* by Roger F. Pasquier; *The Audubon Society Handbook for Birders,* by Stephen W. Kress; *The Bird Watchers Guide* by Henry H. Collins, Jr.; *Birds of the Carolinas* by Potter, Parnell and Teulings; *A Field Guide to the Birds — Eastern Land and Water Birds,* by Roger Tory Peterson.

During the fall and winter, North Carolina museums, colleges and other groups offer a host of bird-watching field trips and workshops. Among them are:

North Carolina Museum of Natural History, Extension Programs, PO Box 27647, Raleigh, N.C. 27611. (919) 733-7450. Field trips, courses, annual trip to Pea Island. Calendar available.

Carolina Bird Club, PO Box 27647, Raleigh, N.C. 27611. Meets three times yearly. Excursions to N.C. mountains and coast to observe birds and habitats.

Local Audubon Society chapters. For information about your local chapter write: North Carolina Audubon Council, Box 2693, Chapel Hill, N.C. 27514.

Marine Resources Center, Roanoke Island, P.O. Box 967, Manteo, N.C. 27954. (919) 473-3493. Bird walks on alternate Fridays. Films, workshops. Calendar available.

Marine Resources Center, Bogue Banks, Atlantic Beach, N.C. 28512. (919) 247-4003. Boat trips, workshops. Calendar available.

Marine Resources Center, Fort Fisher, General Delivery, Kure Beach, N.C. 28449. (919) 458-8257. Field trips, workshops. Calendar available. ⊠

"The more you look at birds, the more the rest of the natural world they inhabit will arouse your curiosity, and the more you will appreciate how all living things, including man, are interconnected and dependent on the same environment for their well-being."

—Roger Pasquier,
Watching Birds: An Introduction to Ornithology.

Get Up For A Buck

A tree stand may be your most essential piece of gear.

by Ed Jenkins and Lawrence Musselwhite

"Whooa-Whooa, Whooa-Whooa . . . Whooa-Whooa, Whooa-Whooa-al-l-l-l." The call of a barred owl pierced the silence of a late autumn afternoon. The feeding deer quickly looked up and focused her attention on the figure high in the sweetgum tree in front of her. Perhaps she expected to see an owl. But it was not an owl that had attracted her attention. It was something much larger and the stand-off had begun. The deer and the creature in the tree were locked in a motionless, dare-you-to-move-first stare. Fifteen . . . 20 . . . 30 seconds passed. Then in a slow but deliberate movement, the doe raised her left front foot and stamped it to the ground trying to get the strange figure in the tree to move and to identify itself. It didn't work. The deer was more curious than frightened and moved a step or two closer to the tree, her eyes riveted to the motionless object. Her large, cupped ears moved independently in every direction trying to detect a give-away sound. A twitching, black nose pointed upward indicated that she was searching for the feared scent of man, but the light breeze blowing from behind her thwarted her efforts. She looked behind her at the two unconcerned fawns feeding in the honeysuckle and with a side-to-side flicking of her tail dismissed the object in the tree as no threat. She returned to her browsing.

I took a large breath of air and made another loud owl call.

The doe raised her head and briefly looked up at me, but the circular chewing motion of her lower jaw never ceased, and I knew she now thought me more of a nuisance than a threat. Feeling more confident, I called a half-dozen more times before the doe finally tired of this big, off-key owl and led her fawns away. After they disappeared into the brown maze of brush and darkness, I quietly climbed down from my tree stand feeling exhilarated. I had purposely dared the deer to identify me, and gotten away with it.

That encounter makes two valuable points. First, it demonstrates the importance of hunting from a tree stand, especially when the wind direction is ideal. Put in its simplest terms, the advantage of still hunting from a tree stand is that it makes the hunter less detectable to a deer, and a deer more detectable to the hunter. Second, as most deer hunters know, there is much more to deer hunting than just aiming at an animal and pulling a trigger. There's the enjoyment of observing the animal and matching wits with one of the sharpest creatures in the wild.

Before we go any further, we need to clear up one point of terminology. In North Carolina, most people who hunt from tree stands refer to themselves as still hunting. I bring this out so as not to confuse any readers who think still hunting is what we in the Tar Heel State refer to as "easing through the woods." But whatever one calls it, hunting from a tree stand produces. That is, it produces if one goes about it in the right way.

Leonard Lee Rue, III

Deer rarely look up, and are usually unaware of anything above ground level unless it moves. That's one reason a tree stand is so effective.

Big game tagging reports submitted by hunters in 1982 indicate that of the 37,902 white-tails harvested in North Carolina, 48.7% were taken with rifles, 4.3% with muzzle-loaders, and 5.5% with bows for a total of 59.5%. These weapons usually are associated with still hunting, while shotguns, which primarily are used when hunting deer with dogs, accounted for 40.5% of the total deer harvest.

The trick to still hunting is determining where to place the stand. Experience is the best teacher, but most graduates of the school of hard knocks will point out that the two most important things to know when selecting a spot for a stand are: (1) the animal being hunted and (2) the land being hunted. The third thing is a Murphy's Law type adage that states the best tree for a deer stand will be the one with the most poison ivy on its trunk.

The more a hunter knows about deer in general, the better he can understand a particular deer and predict when and where it will show up. He should know the animals's likes and dislikes, abilities, drives, habits, and daily routine. He should learn as much as he can about deer by reading, listening to

experienced hunters, and through observation while in the woods and especially when on a deer stand.

Because deer are actually a crop of the land, the hunter needs to know the land he is hunting. That is, where the thickets, ridges, fields or swamps are located and how deer are using these areas. There are several methods that can be used to learn about the land, but usually the more time and sweat one puts into it, the more he will get out of it. It's helpful to get topography maps of the area, and aerial photographs — especially the color-coded ones — are quite informative. But while maps and aerial photographs will show the physical characteristics of the land, they won't show buck rubs or pawings, bedding areas, deer trails, and how the deer are feeding and moving. The only way to learn this is to scout the area. Of course, it is helpful if a hunting buddy or someone familiar with the area will go along. Keep in mind that good deer hunting areas are like good fishing holes — they're usually good year after year.

By knowing the land and the deer, the hunter should be able to figure out where the deer are bedding and feeding and know when, where, and how to set up a stand in just the right spot in the travel lanes deer use between these areas.

Where To Hunt

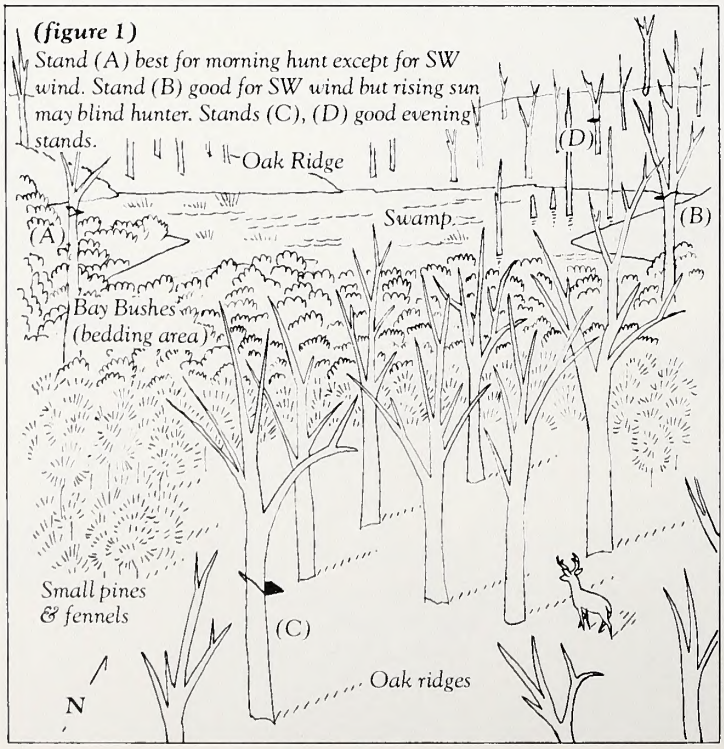
While there are no hard and fast rules as to where to hunt, there are some general guidelines that will improve the odds.

Hunt ridges in the morning and evening — The best hunting areas in the mornings will be between the feeding areas and the bedding areas. A ridge next to a bedding area is sometimes a good bet for a morning hunt as the late-feeding bucks slip back into thick cover where they prefer to remain during the day (figure #1). Many ridges have paths or old logging roads on them and offer some long and usually quick shots at crossing deer (figure #2).

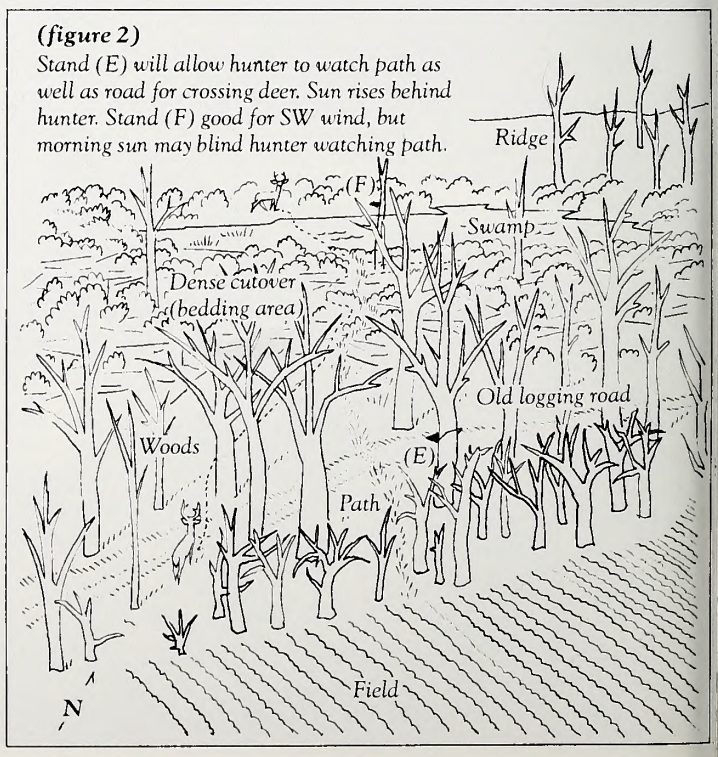
Hunt acorn ridges early in the season — An acorn ridge is a favorite feeding area of deer. Once the acorns begin to fall, deer will visit these areas before they go into a field, especially if these ridges are between a bedding area and a field (figure #3).

Hunt fields in the evening — Deer sometimes will stay in unpicked fields early in the hunting season. Tall soybeans provide ideal cover and food for deer. Field hunting is best in the evenings when deer are moving into the fields to feed. Hunting fields in the morning usually is not productive. Occasionally, a doe or two may visit a field in the morning, but most bucks prefer to feed in open fields at night and begin making their way back to a bedding area before dawn.

Hunters can find telltale signs that deer are using an area by keeping their eyes open. Deer trails through grass and brush are often visible (top right), and rubs (middle right) are also a sure sign bucks are in an area. Bucks make rubs by using their antlers to spar with saplings (near left). Bucks make scrapes (lower right) to mark their territory at the start of the rut.



(figure 1)
Stand (A) best for morning hunt except for SW wind. Stand (B) good for SW wind but rising sun may blind hunter. Stands (C), (D) good evening stands.



(figure 2)
Stand (E) will allow hunter to watch path as well as road for crossing deer. Sun rises behind hunter. Stand (F) good for SW wind, but morning sun may blind hunter watching path.

Leonard Lee Rue, III

Ed Jenkins

Ed Jenkins

Ed Jenkins

Any attempt to enter an open field in the morning will usually spook any deer that may be feeding in it.

Hunt cutovers — One of the best areas to see deer will be in large timber cutovers. After an area is clearcut and begins to naturally grow back, deer are attracted to the tender new growth. As soon as the growth is high and thick enough, deer will bed as well as feed in the area. A good location for a tree stand in an older cutover is a high tree on the edge. When in thick cover, deer will get up several times during the day and feed for short periods of time in the immediate area before lying back down. When deer move during daylight, they prefer to travel trails in the thickest cover. As the sun begins to set, the deer will be moving out of these thickets to more open areas to feed.

Locate and move with the deer — A successful hunter will have to change his hunting methods and territories as the deer alter their habits and food sources. When the leaves begin to fall, it will open up the acorn ridges for more hunting, but the loss of cover also will prompt the deer to change the times when they use the area. As the rut or breeding season peaks in November, a big buck's sex drive will overcome his cautious and secretive ways and lure him out of the secluded areas where he usually stays. During this period, he either will be with a doe or searching for a doe in estrous (heat). And while he can show up at anytime, it's a good bet to hunt either those areas near where you are seeing the most deer or over deer scrapes.

Hunting pressure also will alter deer activity. Sensing danger, wary white-tails will refuse to move during daylight or will move into the swamps and inaccessible areas where they can keep an eye on everything and slip away undetected if danger threatens. Big-racked bucks are older males that survive and grow big because they are able to find areas that are seldom hunted. But not all of these areas are remote. I've heard of big bucks that have bedded in a small group of gallberry and wax-myrtle bushes in an open area next to a major N.C. highway, on golf courses, in a grown-up homesite in the middle of a field, and in the arboretum on the campus of the University of North Carolina at Chapel Hill!

Placing The Stand

Once a promising area is located, there are a few things to consider before one begins hammering the first step into a tree. There may be local regulations or restrictions — such as those on Wildlife Resources Commission game lands — governing the type of stand or how deer stands can be attached to trees. On private property, the landowner may not want hunters to erect permanent type stands that could damage valuable timber trees. An eighty-penny nail hammered into a tree for a step may not kill a healthy tree, but it can make quick work of an expensive saw blade.

When selecting a spot for a tree stand, consider a deer's acute senses and how best to avoid detection.

Smell — We're talking about an animal that can detect the scent of a human several hundred feet away. Every strange odor

Suggestions For Making A Deer Stand Safer and More Productive

Ropes — ALWAYS use a safety rope or belt when hunting from a tree stand. I can think of several incidences where hunters have avoided serious injury or worse by wearing safety ropes. In two cases, the deer stand suddenly collapsed. In another, the hunter fell out of the stand as he was swinging his rifle on a buck running behind him.

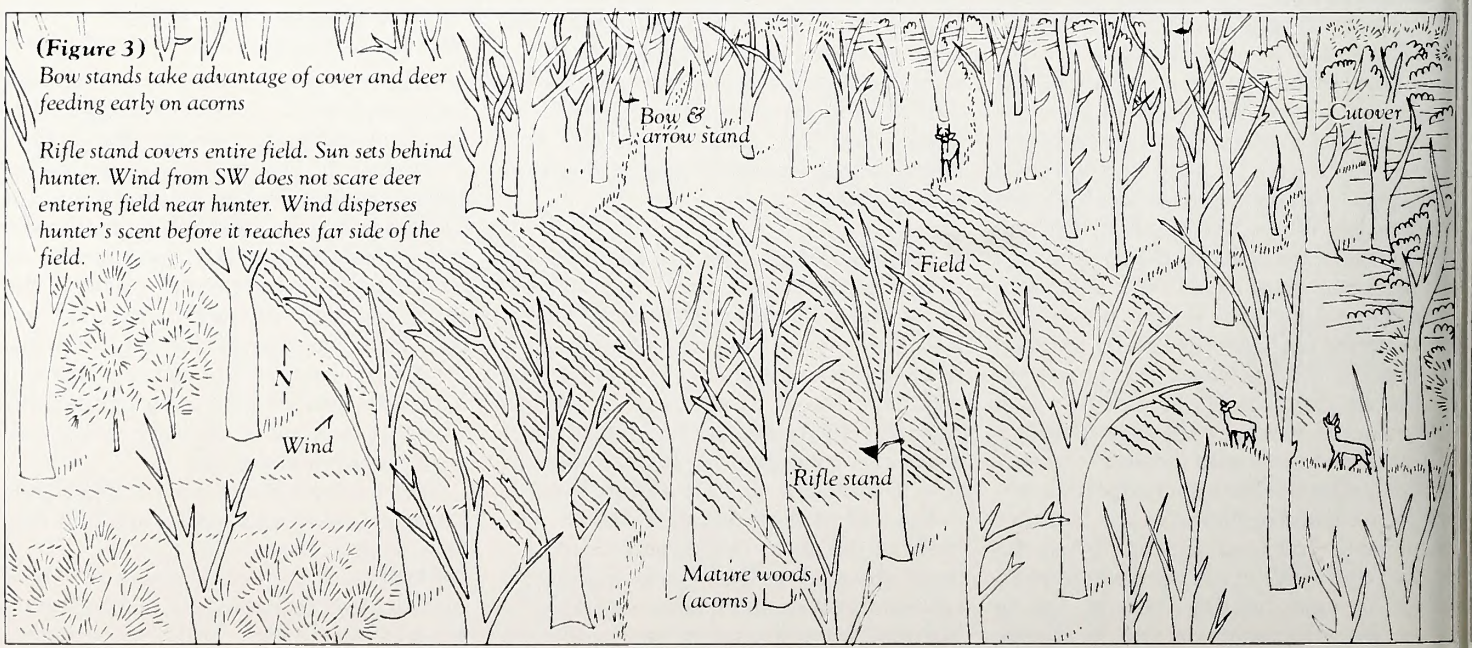
Besides the safety rope, many experienced hunters use two other ropes on deer stands. One is of a small diameter (nylon parachute cord is ideal) that is tied to the stand and used to haul up the unloaded rifle after the hunter climbs into the stand. The other rope is a shorter piece that is tied to the tree or a limb above the hunter's head when he is in the stand. This rope hangs down and can be grasped with the hand that supports the fore-end of the rifle for steadying distant shots. It serves the same purpose as a rest on a rifle range.

Remain still — Movements on the stand should be kept to a minimum. While deer are not in the habit of looking up for danger, any sudden movement will catch their attention. This also applies to side-to-side movements of the head — the eyes should do the searching as the head slowly turns. Some hunters wear camouflage masks to keep the sun from reflecting off their faces, and these also help protect against mosquitoes early in the season. The rifle should be kept flat on the lap so its movements won't mirror the sun's bright rays off the barrel or polished stock.

Avoid looking into the sun — The deer stand should be positioned in a tree so that the hunter will not be looking into a rising or setting sun. These are usually the times of the day deer are most active, and it's next to impossible to put the scope cross hairs on a deer with the sun directly in line and low on the horizon.

Get comfortable — If a person is not comfortable, he can't concentrate or remain still enough to hunt. Forget about that macho "I can take it" attitude when considering sitting in a cramped or uncomfortable position. Hours pass very slowly and limbs become extremely sharp and hard when deer hunting from a tree. Even if the limbs of a tree form a natural seat, take an old boat cushion or pad to sit on.

Carry useful items — Twenty feet up a tree in the middle of the woods is a terrible place to remember that item you forgot. An old Army knapsack is ideal for carrying all the hunter's small gear to the stand. Items that can be useful include: hand pruners, safety rope/buck rope for the stand and for dragging a deer, knife, compass, flashlight, poncho or jacket, mosquito repellent, and toilet paper.



(Figure 3)
Bow stands take advantage of cover and deer feeding early on acorns

Rifle stand covers entire field. Sun sets behind hunter. Wind from SW does not scare deer entering field near hunter. Wind disperses hunter's scent before it reaches far side of the field.

Leonard Lee Rue, III

Ken Taylor

Large bucks are so wary that many hunters believe few would be killed were it not for the lack of caution bucks sometimes display during the rutting season. Though rarely seen, bucks occasionally fight during this period (top right). A well-placed tree stand is the best way to take advantage of any lapse of wariness.

comes under a deer's scrutiny. The sense of smell is a deer's most relied-upon defense. To avoid detection, the deer stand should be placed downwind from the direction the deer is expected to come. During September and early October, the wind usually comes out of the southwest with occasional periods out of the northeast. As the deer season continues into November, the prevailing winds are from the north and northwest. Place and move the stand accordingly. It's best to have several locations pinpointed so that a general location can be hunted regardless of wind direction.

Sight — While a deer may not be able to see colors, it has excellent vision, especially at night or in low light situations. A deer is able to detect the slightest movement, and its attentiveness to detail and familiarity with its living area makes it suspicious of things, such as a tree stand, that suddenly appears in the woods. To avoid discovery, the deer stand should be placed off the deer trail and fairly high in a tree. In general, the higher, the better; however, in mature timber or swamps, hunters seldom need to get above 20 feet. If possible, place the stand at the same level as a group of limbs so that the natural camouflage of the tree can be used to conceal or break the hunter's outline against the sky.

Hearing — There is nothing in the woods that can be mistaken for the sound of a man. Coughing, talking, breaking of limbs under foot, nylon material brushing against briars and brush, and the steady heavy walking stride signal man's intrusion. A hunter can't be completely soundless, but neither are animals in the woods. Squirrels and deer make noise as they move about on dry leaves, but these sounds are natural in the woods. The hunter needs to make his sounds naturally blend into the woods. He should slowly slip through the woods as quietly as possible being careful to step over fallen limbs and branches. He should frequently pause and look around as he makes his way to the stand. The sound of a quick moving object in the woods is an alarm signal to animals, while slow-moving things that frequently stop may be mistaken for the sound of a feeding deer.

When a hunter is in the tree stand, he should avoid squirming or making movements that may cause the stand to squeak or make a noise. If the stand is placed in a loose, rough bark tree such as a sycamore or pine, the hunter should knock off the loose bark on that part of the tree he will be leaning against so that a turning movement later won't cause the clothes to snag the bark or make a sound that could spook a deer in the area. Wool and soft cotton fabrics are much quieter than nylon.

As individual hunters become more skilled, do we need to worry about overharvesting deer? Not hardly, according to Hal Atkinson, chief of the Division of Wildlife Management in the North Carolina Wildlife Resources Commission. If anything, in most areas of the State we need to harvest more does to keep the deer herd healthy and within the carrying capacity of the land. Even with one of the longest hunting seasons in the country, Tar Heel white-tails are flourishing and the outlook looks bright for years to come. ⊠

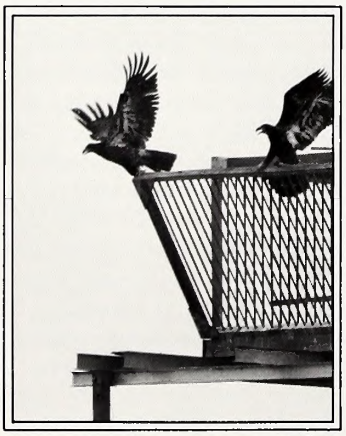
Bald Eagles Released At Mattamuskeet

Eagle Projects Show Early Promise

Written and Edited by Mark Taylor

The year was a big one for eagles in North Carolina. Two young bald eagles were released at the Lake Mattamuskeet National Wildlife Refuge in Hyde County last summer as part of a long-term program to restore this endangered species to North Carolina. Meanwhile, at the other end of the State, eight young golden eagles were released in the Mountains as the golden eagle restoration project completed its third year.

The bald eagles that were released at Lake Mattamuskeet were obtained from wild nests in northern Wisconsin, and were held for about nine weeks in special cages on towers overlooking the lake. By confining these birds in cages during a period when they would normally be restricted to their nests and take their first flight in the area, biologists hope that the eagles will identify Lake Mattamuskeet as "home" and return here to nest when they are mature at four to five years of age. Following their release, the young eagles remained in the area for some time, apparently having little difficulty finding food in their new environment.



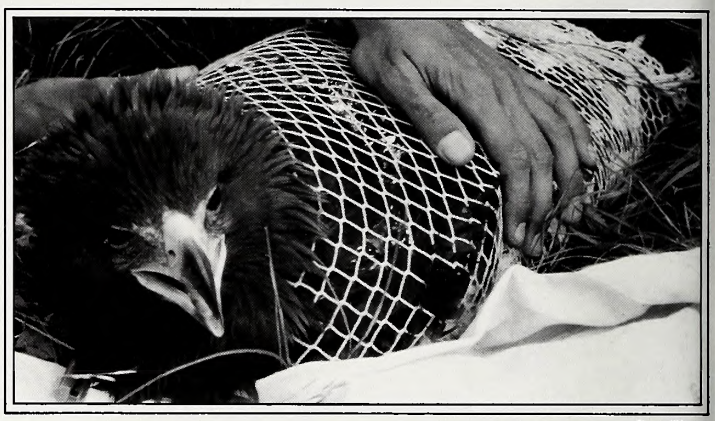
Kay Frazier

We Have A Lift-off: *Two young bald eagles were released last summer at the Lake Mattamuskeet National Wildlife Refuge in Hyde County as part of a program to restore this endangered species to North Carolina. At last report, the birds were doing well.*

"We're very optimistic about the release at Lake Mattamuskeet," said Larry Ditto, manager of the refuge. "The Lake Mattamuskeet refuge offers some of the best habitat for bald eagles on the East Coast. In fact, the last successful eagle nesting in North Carolina occurred at the refuge in 1972. There's an abundant supply of fish and wildlife for the birds in the lake and nearby Pamlico Sound. There's plenty of large trees for nesting, and the refuge also offers the isolation and protection that eagles need."

Biologists plan to continue the project next year, and hope to obtain larger numbers of birds — and build additional release sites — in the future. The goal of the project is to establish a nesting population of 30 bald eagles on the coast of North Carolina within 10 to 15 years. The project is a joint effort of the U.S. Fish and Wildlife Service, Tennessee Valley Authority, N.C. Wildlife Resources Commission, N.C. State University, N.C. Wildlife Federation, and the University of North Carolina at Wilmington.

The golden eagle project completed its third successful season as eight young golden eagles were released from high, grassy balds in the Pisgah National Forest in Haywood County last August. In 1982, four birds were released, and two birds were released when the project began in 1981. Golden eagles are native to the North Carolina Mountains, but have not nested here for almost a half-century.



Curtis Wooten

A Golden Opportunity: *Eight young golden eagles were released in western North Carolina last summer. Once native to western North Carolina, golden eagles may return to nest here in 1985 or 1986 thanks to an on-going restoration program.*

Little is known about the fate of the golden eagles that have been released. All of the birds have been tagged, and one bird that was released last year was found dead of electrocution beneath a power line in Georgia. One other bird from last year's crop was picked up exhausted in western Kentucky two weeks after it was released. The bird was nursed back to health and re-released in the mountains of western North Carolina. It has not been sighted since.

The golden eagle project is a joint effort of the U.S. Forest Service, U.S. Fish and Wildlife Service, Tennessee Valley Authority, N.C. Wildlife Resources Commission, National Park Service, Eagle Propogation program in St. Louis, Schiele Museum of Natural History in Gastonia, and the Asheville Chapter of the Carolina Bird Club.

"Both of these projects show that the environmental laws which were passed to protect our environment are working," said Stuart Critcher, head of the Habitat Conservation Section of the N.C. Wildlife Resources Commission. "Populations of eagles, other raptors, and many songbirds were drastically reduced by the use of DDT and other similar persistent pesticides in the 1960s. However, since a ban was placed on the use of DDT and similar substances in 1972, levels of these chemicals in the environment have dropped to the point where reproductive ailments — such as eggshell thinning — are no longer serious problems."

The bald eagle and golden eagle projects are both part of the Wildlife Commission's nongame and endangered species program, which will be funded by the recently enacted nongame tax checkoff. This program allows citizens to designate a portion or all of the refund on their state income tax form to be used for the management and protection of nongame and endangered wildlife.

Blackbirds Band Together

Nature Provides Lesson In Harmony

It was a bright cold November morning every twig and blade of grass was coated with glistening frost. Eight birders were walking across a field near Pineville, alternately looking upwards at the birds and downwards at the beauty of the white crystals. When one of the group cried, "Look!" every eye followed the pointed finger. High above us three perfect circles of black dots were converging from different directions. It was agreed upon by the birders that they were mixed flocks of blackbirds. The difference in size and color was because of the difference in altitude of each flock. The smallest and grayest dots were highest, and the largest and blackest dots were lowest.

In awed silence, we watched the three separate circles meet above us and then pass through each other without losing their identities. Descending and ascending, the three circles of birds seemed to undulate to some silent music in a slow dance, merging and separating and then merging again. Then, two of the circles gave up their separate identities and merged into one. Finally, after several more passthroughs, the third circle merged with the others into one large undulating circle of about a thousand birds. Someone ended the awed silence with a gasp of, "How beautiful!" Another spoke the worlds that were in everyone's mind, "I could almost hear the music."

The spell was broken when we noticed a red-tailed hawk circling over the nearby woods, moving ever upwards toward the perfect circle of birds above us. Incredulous that he would take on such a large flock, one of the birders said, "He must be hungry this morning." Higher and higher the hawk circled, and then he flew towards the edge of the flock. At least a dozen of the largest birds went at him in full fury. They repeatedly swooped at him, driving him down and away from the flock. Finally, in desperation, the hawk flew straight down into the woods, and the blackbird guards rose triumphantly back to the others.

The three different groups resolved their differences in just a few minutes without Kissinger's diplomacy, nuclear threat, or economic intimidation. Then, they determined a guardian group to protect the flock from attack without a United Nations to appoint a peace-keeping force. The three became one in peaceful unity in less than 15 minutes, and then they resumed their southward journey to their winter haven. It was a truly memorable sighting of heavenly harmony.

— *Elaine L. Keen, Charlotte*

Jack Dermid

Safety In Numbers: *It takes a brave hawk to tackle a huge flock of blackbirds, much less three flocks as one reader observed last November. However, the three flocks quickly banded together to repel the intruder — proving a lesson in group unity.*

Wildlife Art Show

Show Your Stuff

Wildlife art is growing ever more popular, and one of the best shows in North Carolina is sponsored by the Wake County Wildlife Club. The North Carolina Wildlife Art Exhibition and Sale will be held on December 1-3 at the Cary Village Mall, and interested artists are urged to submit entries.

For information on entering the exhibit, contact the Wake County Wildlife Club, P.O. Box 12202, Raleigh, N.C. 27605.

Wildlife In Your Will?

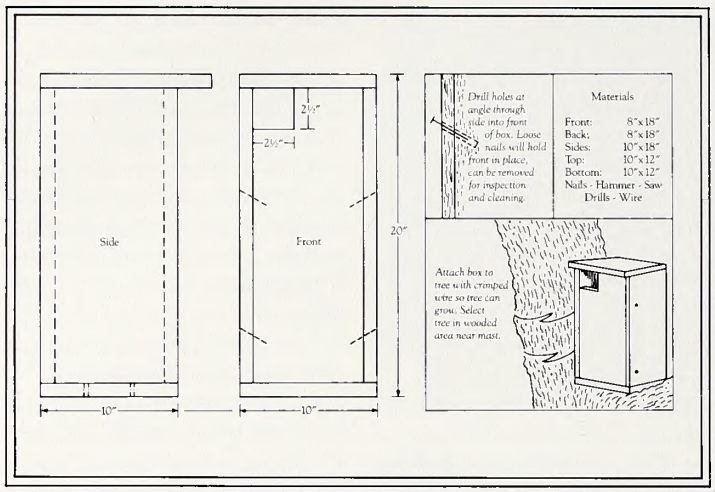
The Wildlife Endowment Fund recently received a large gift from the estate of Mrs. Beatrice Barsantee of Hendersonville, who died last April. Mrs. Barsantee enjoyed bird-watching, and left property valued at approximately $50,000 to the Wildlife Commission in her will.

"We are very grateful for the gift that Mrs. Barsantee left to the Wildlife Endowment Fund," said Debbie Paul, assistant to the executive director of the Wildlife Commission. "We are also happy to work with anyone who would like to contribute to wildlife conservation through a bequest in their estate. This is an excellent way to make a lasting contribution to wildlife conservation."

For more information on contributing to the Wildlife Endowment Fund through bequests contact the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Simple To Make

Den Boxes Increase Squirrel Populations



Almost everyone likes squirrels — whether you watch them frisking about in the oaks in our yard, or seek the makings of a squirrel stew in a remote Carolina woodlot on a chilly autumn day. And, if you'd like to bring more squirrels into the world, you can. Simply consider building a few squirrel boxes, and place them in your yard or nearby forest.

"One of the biggest limiting factors in squirrel populations is suitable dens, which are found in cavities in old hardwood trees," said Carl Betsill, a small-game biologist with the N.C. Wildlife Resources Commission. "Erecting a few artificial nest boxes will help squirrel populations in almost any forest. This is especially important in pine forests and young hardwood forests, where large, old cavity trees are lacking. Squirrel boxes also provide homes for a variety of birds like screech owls, great-crested flycatchers, flickers and many others. Even if a squirrel doesn't take up residence in your squirrel box, rest assured that it will not go to waste."

This design for a squirrel box may easily be built in a home workshop, and uses common, one-inch thick rough lumber (pine is fine). The outside of the box may be treated with a wood preservative, but the inside should not be treated. Be sure to drill four holes in the bottom for drainage.

Squirrel boxes should be placed anywhere from 10 to 50 feet off the ground, but 20 to 30 feet is probably the best height. It's best to place the box in the crotch of a tree where a limb will support it, and position the entrance hole next to the tree trunk or branch so that the squirrel has easy access to his new home. Also, place a crimp in the wire holding the box to the tree so that the tree will not be girdled by the wire as it grows. Placing one to two boxes per acre is enough to make a difference in squirrel numbers.

Small-Game Seasons Open

The outlook for quail and rabbit populations this year is not as bright as it might be.

"Extreme weather conditions this year have been hard on small-game populations," said Carl Betsill, a small-game biologist for the N.C. Wildlife Resources Commission. "In the early spring we had a lot of rain, and this lowered survival rates in the first litter of young rabbits. However, later litters did well. The quail escaped the rains, but were hurt by the excessive heat, drought, and low humidity that we experienced in mid-summer. The hatching success of quail eggs under these conditions is poor, especially in areas like the Sandhills, where the heat and drought were even worse than in the rest of the State."

Quail and rabbit seasons open on November 19 and close on February 20. The daily bag limit for quail is 10 birds with a possession limit of 20 and a season limit of 100. The daily bag for rabbits is five with a possession limit of 10 and a season limit of 75.

Terry Shankle

Doing Fine

Fox Squirrels

Dear Sirs:

I greatly enjoy reading your magazine, and am very interested in the conservation of North Carolina's wildlife. I was rather disturbed, however, to see in the recent copy of North Carolina's hunting and fishing regulations that there is a hunting season for fox squirrels?

Aren't these animals endangered? I seem to recall reading an article in *Wildlife In North Carolina* stating that fox squirrels are a rare sight. Given these circumstances, why are they being hunted?

— Arthur Rockwell
Raleigh

Your confusion is understandable. However, the fox squirrel is not endangered.

While fox squirrels have a limited range, which is confined to old-growth longleaf pine forests, they are abundant in suitable habitat. There is a direct correlation between the decline in fox squirrel populations and the conversion of mature longleaf pine forests to shorter-rotation pulp forests. In fact, fox squirrels in North Carolina are most abundant on the 57,000 acre Sandhills Game Land near Southern Pines. This area is owned by the Wildlife Commission, and longleaf pine is harvested on a 100-year rotation. This long-term timber harvesting schedule not only provides lumber, but good habitat for fox squirrels as well. Although the elusive animals are hunted on the Sandhills Game Land, populations are healthy. We appreciate your concern about wildlife, but don't worry about a hunting season on fox squirrels — as long as adequate habitat is available, the fox squirrels will do just fine.

Use Open Choke; Shorten Lead

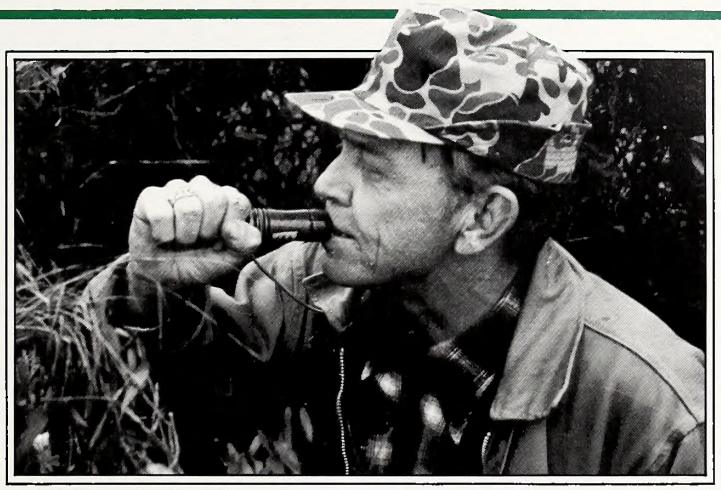
Changes in Shooting Tactics Needed For Steel Shot

Steel shot is required in all gauges for waterfowl hunting at the Lake Mattamuskeet, Swan Quarter, and Cedar Island national wildlife refuges in eastern North Carolina, and in 12-gauge shotguns only on the Cape Hatteras National Seashore recreation areas. Hunters should be aware that they may need to make some changes in their shooting habits to shoot steel shot effectively. While the use of steel shot is controversial, and studies of the effectiveness of steel shot show conflicting results, there is no doubt that the ballistics of steel and lead shot differ.

The first step is to switch to a larger shot size. Steel shot is less dense than lead shot, so larger pellets are needed to maintain the same amount of knock-down power. For large ducks — like mallards, pintails and black ducks — the best choice in steel is #2 shot. For smaller ducks, like teal, #4 steel shot is effective. The best all-round choice for duck hunting in steel, however, is #2 shot. Goose hunters should not use anything smaller than #1s or BB shot in steel.

The second difference between lead and steel shot is in the shot pattern. Steel shot is considerably harder than lead shot, and doesn't become deformed by the gun barrel when it is fired. Consequently, the shot pattern for steel shot is smaller and shorter than the pattern for lead shot. In fact, the diameter of a steel-shot pattern may be one-third smaller than a lead-shot pattern, and the "shot string" may be only half as long.

Hunters may compensate for smaller patterns by using a different choke. The tightest choke that should be used with steel shot is a modified, and this will shoot a fairly tight pattern — especially at close ranges. Many authorities consider an improved cylinder the best choice for steel shot. The performance of various brands of steel shot also differs. Performance within individual guns also varies, so it's a good idea to "pattern your shotgun" for steel shot before hunting.



Luther Partin

New Tricks: *Waterfowl hunters who use steel shot may need to make some changes in their shooting habits. It's best to use an open choke with steel shot and increase shot size.*

A third difference lies in muzzle velocities. Since steel shot is lighter than lead and doesn't become deformed by the gun barrel, it generally travels about 100 feet per second faster than lead shot. Hunters may find that they need to shorten their leads to adjust for this difference. At close ranges — from 20 to 25 yards — hunters shooting steel shot should use virtually no lead at all, but should place the gun barrel right over the duck's head. From 30 to 40 yards, hunters should lead birds by only one to two feet. If you find yourself missing ducks with steel shot, try shortening your lead. The chances of crippling ducks with both lead and steel shot increase considerably past 40 yards, so hunters should pass up long shots.

Finally, steel shot should not be used in old, expensive, double-barreled shotguns. Steel shot is harder than lead, and may damage the barrels of these older firearms. Steel shot should also not be loaded into shells made for lead shot. Special components are needed for loading steel shot, and a dangerous situation could result from improper loading of steel shot. Substitutes for steel shot — like air-rifle pellets or ball bearings — should never be used.

The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina,* and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Status At July 31, 1983

	Numbers Sold	Revenue Received
Lifetime Sportsman License	4775	$1,369,739.96
Lifetime Hunting License	50	8,878.26
Lifetime Fishing License	232	37,228.41
Life Subscriptions to WINC	175	19,167.88
Contributions	—	28,616.65
		Fund Total: $1,463,631.16

Tar Heel Quail Get A Boost

Ken Taylor

Building Better Hunting: *The Central Carolina Chapter of Quail Unlimited recently presented the Wildlife Commission with a $573 contribution to be used for quail management in North Carolina. Here, Gene Parson (left) of Quail Unlimited presents the contribution to Commission Chairman J. Robert Gordon.*

Only $5

1983-84 North Carolina Wildlife Calendar

Six nationally known wildlife artists have contributed fine outdoor and wildlife paintings to the 1983-84 calendar. Their paintings are in museums and private collections throughout the country, and you've seen examples of some of their work in WILDLIFE IN NORTH CAROLINA magazine. This calendar is almost certain to become a valuable collector's item with such artists featured as:

- Bob Binks
- Bob Dance
- Cecil Eakins
- Larry Barton
- Duane Raver
- Lee LeBlanc

Calendars are $5 each; however, if you purchase 50 or more, we will sell them to you for only $4 each.

This is a project of the Chairman's Wildlife Advisory Committee, a group of North Carolina conservation leaders who have been appointed by the Chairman of the Wildlife Resources Commission to provide information, guidance and support for the agency's wildlife conservation programs. Proceeds from the calendar will go for these purposes.

Yes, please send me _____ copies of the North Carolina Wildlife Calendar. I have enclosed cash, check or money order for _____. We do not bill.

Name _____

Street _____

City _____ State _____ Zip _____

Phone Number (including area code) _____

Return form and payment to Chairman's Wildlife Advisory Committee, care of George Mason, P.O. Box 473, Dallas, N.C. 28034 or give the form to a member of the committee. Checks should be made out to the Chairman's Wildlife Advisory Committee.

Calendar Of Events

November 2-4
27th annual Rowan Museum Antiques Show at the Civic Center in Salisbury.

November 3-5
Hatteras Surf Fishing Tournament, the largest invitational surf-fishing tournament on the East Coast. For more information, contact the Cape Hatteras Anglers Club, P.O. Box 145, Buxton, N.C. 27920.

November 5
Mill Creek Oyster Festival at Newport. Features parades, arts and crafts, entertainment, and, of course, lots of fried oysters.

November 5-6
Third annual Bentonville Living History-Tactical Demonstration at the Bentonville Battleground. Exercises, demonstrations, and battlefield re-enactments will involve over 300 Union and Confederate soldiers. For more information, contact the Bentonville Battlegound — Programs Coordinator, P.O. Box 27, Newton Grove, N.C. 28366.

November 19-20
Gun Show at the State Fairgrounds in Raleigh.

November 20
"A Pioneer Thanksgiving" at the Schiele Museum of Natural History in Gastonia. Demonstrations of weaving, blacksmithing, pioneer games, molasses making, corn grinding, and other forgotten skills. For more information, contact the Schiele Museum, P.O. Box 953, Gastonia, N.C. 28052.

November 24
Moore County Hounds Opening Day Hunt at Southern Pines. For more information, contact Mile Away Farms, Box 689, Southern Pines, N.C. 28387.

November 25-27
Eastern Quarter Horse Show at the State Fairgrounds in Raleigh.

Kay Frazier

A Good Night's Work: *The Triangle Flyfishers Chapter of Trout Unlimited recently donated the proceeds from its annual banquet to the Wildlife Endowment Fund. Here, Steve McDonald (right), president of the Triangle Flyfishers, presents Wildlife Commission Chairman J. Robert Gordon with a check for $1,500.*

Gifts from Wildlife
... the perfect
way to celebrate
the holiday season
WILDLIFE
IN NORTH CAROLINA
OUTDOOR
NORTH CAROLINA
Ken Taylor

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WILDLIFE IN NORTH CAROLINA

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Sylvia II's Rich Cargo

by Jim Dean

When I first met Bob and Mary Simpson back in the 1960s, they were still living on a 42-foot boat named *Silver Spray*. I remember sharing a pot of coffee with them on the boat at its berth in Peltier Creek just west of Morehead City. Bob developed many of his fine photographs in a tiny darkroom on the boat, and even back then he was tapping out articles for national magazines and weekly columns on the great outdoors for the Raleigh News & Observer.

From autumn until late spring, they lived more or less at Morehead — except for boat trips up and down the East Coast — but they always left to roam throughout Montana, Wyoming, Idaho and neighboring states for several months each summer. They just tossed cameras, typewriter, rods, guns, sleeping bags and a frying pan into a beat-up Volkswagen van and took off.

I was impressed; really impressed. I remember thinking that there might be only two kinds of people. There were those like Bob and Mary who shunned the normal routes to success, and had sense enough to know what truly made them happy. Then, there was the rest of us — the vast majority — who let weeks, years, or even a lifetime slip away without ever having followed a dream.

Bob Simpson hoists a pair of friends he's invited for supper.

Nor did I think of them as selfish — quite the opposite. They were serious environmentalists long before it was fashionable (and they still are even after it has again become moderately unfashionable). Bob's columns have taught respect for our natural world to countless readers, and he and Mary have been both active and effective in promoting sound environmental decisions. They've also had one heck of a lot of fun.

I was thinking of this on one of the first crisp nights in September this year after some of the hottest weather anyone could remember. I was sitting on their newest old boat, *Sylvia II*, with my son Scott, Bob and Mary and Louis Rubin, the publisher of Bob's first book. Earlier, in their small house at the end of Termite Lane, the Simpsons had hosted a little celebration, and it seemed fitting to walk out to Peltier Creek and pay our respects to the 50-year-old Core Sound sink netter that was partly responsible for it.

Many of us who have followed Bob's News & Observer columns over the years have hoped that someday he might write a book. That he has finally done so is no doubt due to Rubin's insistence and Mary's assistance, and the result has been well worth the wait.

When The Water Smokes: A Peltier Creek Chronicle was published in mid-September by Algonquin Books, Rubin's relatively young publishing outfit in Chapel Hill. Basically, it is the story of how *Sylvia II* was acquired for $300; she lay window deep after a storm at the dock next to Sanitary Restaurant in Morehead City, and how she was restored and integrated into the Simpson's enviable lifestyle.

Sylvia II is the handsome catalyst for this book; a propeller antique that carries the Simpsons into the natural world of North Carolina's sounds, bays and barrier islands, and eventually down the Intra-Coastal Waterway to the St. Johns River in Florida. But as anyone would expect who has read Bob's columns over the years, the restoration of *Sylvia II* is not the real subject. She is merely a craft to carry the reader to a deeper love and understanding of the rapidly changing natural world around us.

The book is also a manifesto for those of us who have always secretly wondered what it would be like to march to a different drummer.

Most of us do not spend the better part of our lives following our dreams. Nor do we shun most of the contrived and costly "necessities" of life that lock us into dull routines. We accept narrow responsibilities, like mowing lawns and climbing social ladders, yet we neglect such larger responsibilities as stewardship of the planet we call home. And through it all, we never seem to have time to stop and look around, to enjoy a sunrise or marvel at some natural mystery.

Bob and Mary Simpson have found a way to savor more of life and after you read *When The Water Smokes* you will almost surely wonder why you have not done the same.

When the Water Smokes: A Peltier Creek Chronicle, by Bob Simpson. Published by Algonquin Books, P.O. Box 2225, Chapel Hill, N.C. 27515. Hardcover, 189 pages, $15.95.

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WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

CONTENTS

4 **Where The Ducks Always Fly** *by Jim Dean*
When Chet Reneson captures a hunting scene in watercolor, the duck hunter feels right at home.

10 **When Wolves Roamed North Carolina**
by Lawrence S. Earley
Until the early 1800s, wolves were fairly common in this State, and reports of encounters appear regularly in early Moravian diaries.

15 **Sly Like a Fox** *by Rick Estes*
The red fox is a handsome rogue, celebrated for his cunning ways, and not all of it is fable.

18 **The Winter Coast** *by Lawrence S. Earley*
When chill winds drive the crowds away, beauty stalks the lonely dunes, surf and sounds.

24 **The Perfect Bird Hunt** *by Mike Gaddis*
Even in real life, some quail hunts are so memorable that you would not change a single detail.

DEPARTMENTS

Out Natural Heritage *by Jim Dean*

Nature's Way *by Lawrence S. Earley*

Back Of The Book *by Mark Taylor*

Front Cover *Rough weather is characteristic of waterfowl hunting, and perhaps no one paints it better than Chet Reneson. This watercolor is titled "Bad Luck Wind."*

Back Cover *A wary red fox senses danger before running for cover. Photograph by Eugene Hester.*

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Three Of A Kind

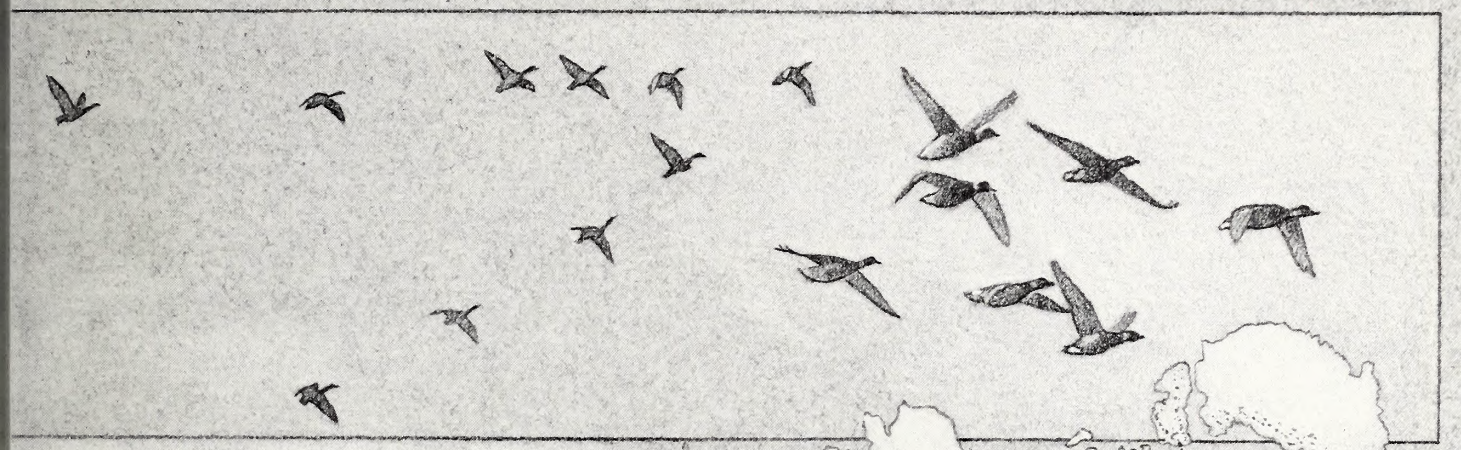
by Lawrence S. Earley / illustrated by David Williams

Come winter, a bitter northeast wind has been known to chill a body, but the wild and haunting sound of geese out of a leaden sky causes shivers of another kind. The arrival of Canada geese, snow geese and brant — North Carolina's three goose species — is a welcome sign of the coldest season.

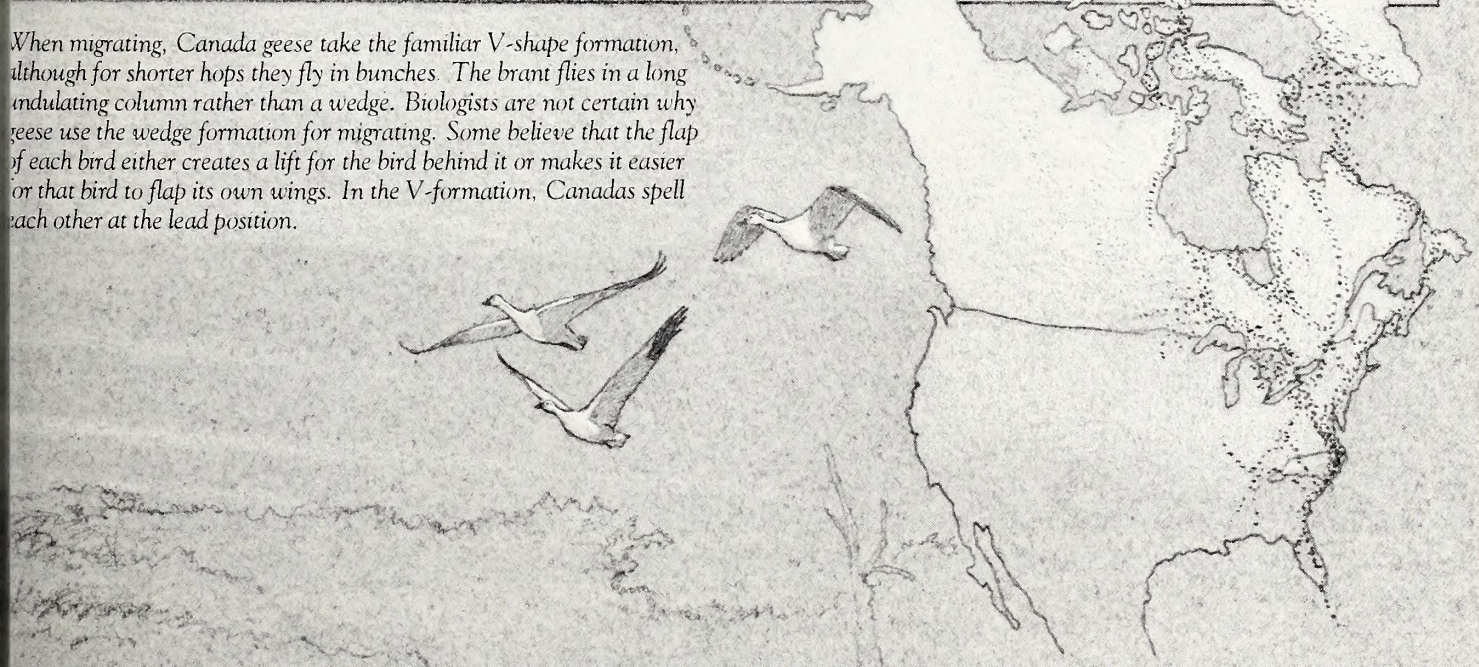
Canada goose: Among the most beautiful of waterfowl, the Canada goose is easily identified by its black head, white neck bandage and brown upper parts. There are 12 subspecies of Canadas, varying in size. About 30,000 Atlantic or "common" Canada geese, weighing an average of about 8.4 pounds (male), winter here. A giant subspecies, weighing up to 18 pounds, was once found in great numbers in the northern prairie states, but has dwindled in numbers as its prairie habitat was claimed by farms. The Canada goose, like most geese, mates for life, although if one dies the survivor will take another mate.

Snow goose: About 15,000 snow geese winter along the North Carolina coast, down from nearly 30,000 a short time ago. As befits its name, the snow goose is white except for its wing tips which are black. This marking may be useful in communicating, but biologists have also found that the pigment makes the black feathers more wear resistant than the white feathers. The blue goose was once throught to be an entirely different goose species, but biologists have concluded that it is a color phase of the snow goose. The snow goose breeds in the arctic and has been known to fly 2,000 miles nonstop to reach winter grounds.

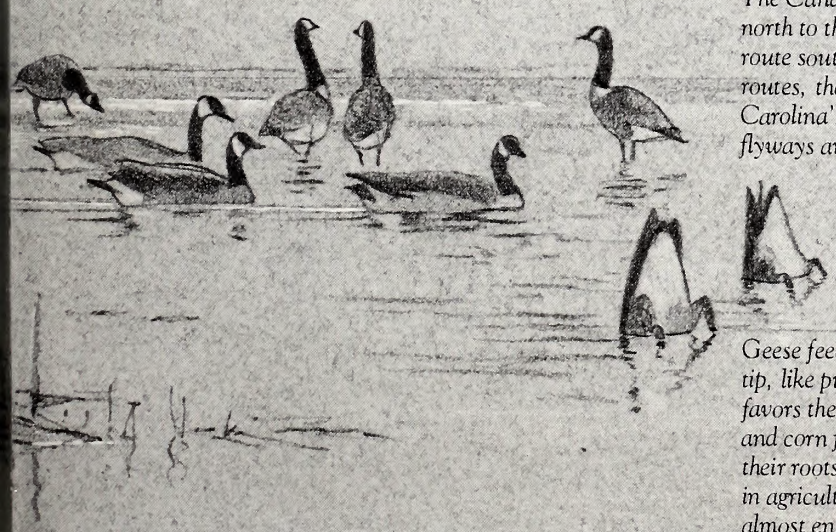
Brant: Weighing little more than a mallard, the brant is our smallest goose. Mostly black and brown, it is a saltwater species seen in small flocks on the water. Once its preferred food was eelgrass, but in 1931 a decline in eelgrass forced it to turn to sea lettuce. Today in some states brant are grazing on lawns and wheatfields. It flies fast, 63 mph according to one clocking, and low, no higher than 200 to 300 feet above the ocean. (The record for altitude is held by the bar-headed goose which climbs to 30,000 feet to cross the Himalayas!)



When migrating, Canada geese take the familiar V-shape formation, although for shorter hops they fly in bunches. The brant flies in a long undulating column rather than a wedge. Biologists are not certain why geese use the wedge formation for migrating. Some believe that the flap of each bird either creates a lift for the bird behind it or makes it easier for that bird to flap its own wings. In the V-formation, Canadas spell each other at the lead position.



The Canada goose, snow goose and brant breed in eastern Canada north to the arctic. Like many other bird migrants, they take a general route south in winter and north again in spring. There are four such routes, the Atlantic, Mississippi, Pacific and Central flyways. North Carolina's geese use the Atlantic Flyway, but biologists note that these flyways are broad and general paths rather than strict routes.



Geese feed in a variety of ways. The Canada goose and the brant both tip, like puddle ducks, when feeding on the water. The Canada goose favors the rootstalks of several aquatic plants, but will also eat grain and corn from fields. The snow goose uses its bill to lift marsh plants by their roots in marshes, but it has changed its feeding habits and forages in agricultural fields as well. Until recently brant restricted its feeding almost entirely to sea lettuce and eelgrass growing just below the water's surface, but some states report that brant are now grazing on lawns and wheat fields.

Where The Ducks Always Fly

Any duck hunter would gladly climb into one of Chet Reneson's watercolors and share his cold, wet, wonderful world.

by Jim Dean

A duck hunter could look at one of Chet Reneson's waterfowl scenes and get goose bumps. That's not just a bad pun; it's the truth. When Reneson paints the spitting snow, wind-whipped water and raw skies, it makes you shiver just to look at the hunters crouched in a freezing blind waiting for the ducks to pitch in.

But it's also true that part of those goose bumps arise from sheer awe at Reneson's skill as an artist. To anyone who has ever tried to paint with watercolors, his talent is even more impressive. Up close, those apparently casual brush strokes, washes of wet color that bleed into a third color, bold splotches and spatters all seem disconnected — until you stand back slightly and see that it looks just right. Try to duplicate it with your own brushes and watercolors, and you'll have either a sopping mess or the kind of tightly drawn and amateurish painting you might see on the menu of an oyster bar.

As is often the case with the most skillful watercolorists, Reneson makes it look frustratingly easy. But it isn't easy, not always even for Reneson who, at the age of 49, is still seeking new challenges.

"I realize that I'm probably best known for my paintings of duck hunters and other waterfowl hunting scenes, and I've done a lot of them," said Reneson over the phone from his home in Lyme, Connecticut. "But I've done other paintings I feel were more profound, and I hope to continue to grow. I'm still looking, planning and trying other subjects and techniques.

"For example, I've done a lot of watercolors of Altantic salmon fishing, bonefishing, tarpon fishing, trout fishing and upland bird hunting, and I enjoy that. Recently, I've been painting a lot of watercolors set in the Bahamas, and the subject matter is not fishing, but things like street scenes. Also, after years of painting almost entirely with watercolors, I'm going to get back to oil painting for some of my works. That's what I learned first

paintings by Chet Reneson

Roost Hunt

Numb Fingers, Cold Shells

Up Pothole Creek

at the University of Hartford Art School. I want to try different subjects because I would rather not be remembered as simply a wildlife artist."

As an artist, Reneson may indeed be best remembered for watercolors and oils of subjects that are far removed from a duck marsh or trout stream, but it is also a dead certainty that sportsmen will never forget his many outdoor watercolors. Already, he has been the Trout Unlimited Artist of the Year (1983), and last year he was Ducks Unlimited's Artist of the Year. He has also been asked to paint a limited edition print for the Atlantic Salmon Federation.

"One reason so much of my work until now has dealt with hunting and fishing subjects is simply because I love the outdoors and I've spent a lot of time out in it," said Reneson. "The reason so many watercolors have focused on waterfowl hunting is because when I was young, I lived in good duck-hunting country. It was what I knew best. I loved the boats, the decoys, the marshes and the whole look of waterfowl hunting. I grew up on a farm, and the only blocks of free time I had were in the late fall and winter, so naturally I did a good bit of waterfowl hunting. I was never really a very serious hunter, but I had two hand-me-down retrievers who usually wound up eating my lunch, and I spent a lot of time in the marshes. Those experiences gave me the background I needed to paint that kind of hunting.

"Later on, after I was grown and had a chance to hunt elsewhere and also do more fishing, I found out that I liked a lot of other things, too," said Reneson. "I'd have to say that my favorite of all the outdoor sports is Atlantic salmon fishing, with bonefishing second. My biggest thrill was catching a 19-pound Atlantic salmon on the St. Paul River this year. But I'm not hooked on catching just big fish. I love it all. I even tie my own flies and make my own decoys.

"But painting is perhaps the most significant of the many things I enjoy," said Reneson. "Art is a way of life. I appreciate great art, and I never miss an opportunity to go to a museum and see the masters. I especially like Winslow Homer, Andrew Wyeth, Thomas Eakins, the French Impressionists and the Chinese and Japanese who painted with such graceful precision. I think the secret to the success of any artist is to go to a good art school — why reinvent the wheel? It's better to learn from the experiences of others and then develop your own style."

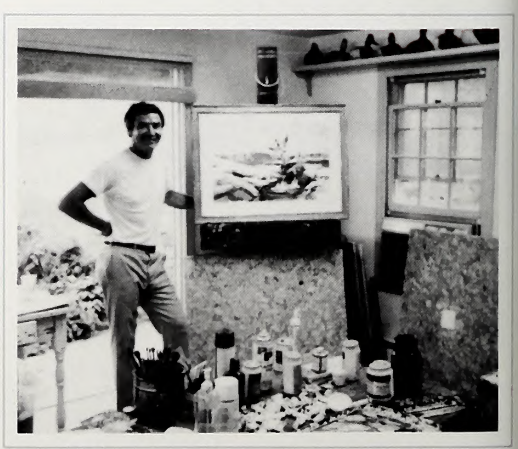
It will come as no surprise to learn that Reneson has hunted waterfowl in North Carolina, specifically redheads on Core Banks. Several of his paintings reflect his experiences in this State. One he likes very much is a sunset scene of the Swan Island Club with hunters coming in after a day in the marsh.

Even though Reneson does not usually tag a painting with a specific location, virtually every waterfowl hunter can look at those that appear on these pages and feel right at home. They have the kind of universal appeal that causes a hunter to remark, "I know that spot. I've been there."

"I do the best I can," said Reneson, "regardless of the subject matter. I consider myself a serious artist, and while I know that I'm not going to be a Homer, I'm going to try to come as close as possible."

There aren't too many Chet Reneson's around, either, but there are a lot of watercolorists who'd be pleased if they could paint half as well.

Some of Chet Reneson's many watercolors have been made into prints and are available through the artist. Those who might want to purchase some of these, or perhaps an original painting, can write for a brochure and prices. Write Chet Reneson, Lyme, Conn. 06371.⊠



Chet Reneson in his Lyme, Connecticutt studio.

Out Of Reach

Early Morning Hunt

When Wolves Roamed North Carolina

by Lawrence S. Earley

"Wolves have been very bad in the neighborhood and have even attacked men."
Moravian diary, May 1, 1790.

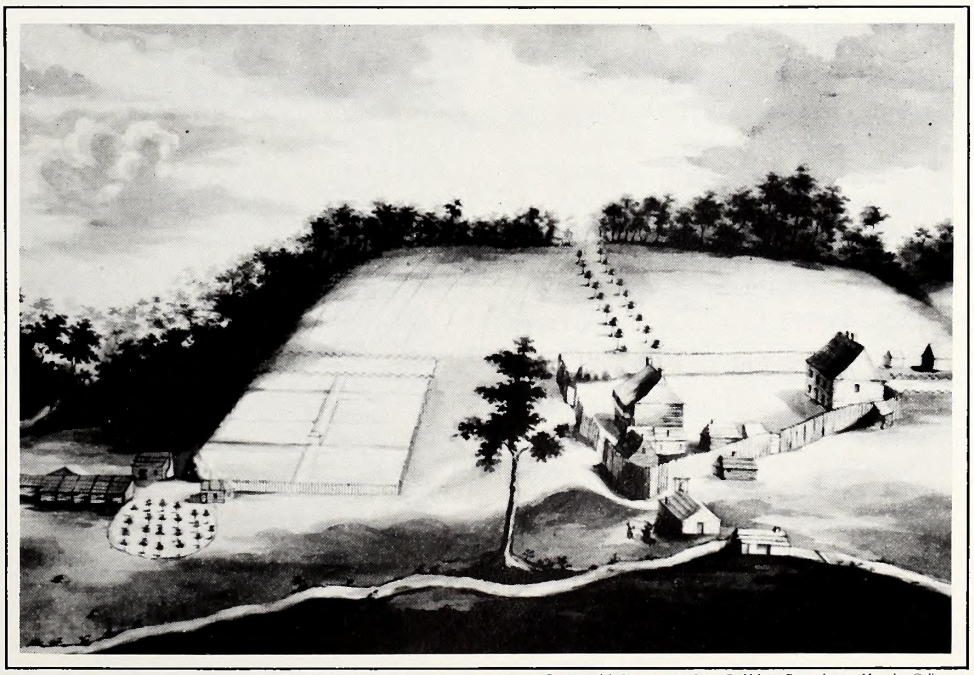
This is a winter's tale. It's a story to be savored while a fire posts a guard against the chill of a night and the ghosts of time walk the mind. It's a fit story for the end of the year with its remembrances of things past. It's also a story of a birth, the birth of North Carolina.

On the 24th of November, in the year 1752, Bishop August Gottlieb Spangenberg spent the night in a camp five miles from Table Rock Mountain, in the forks of a stream that flowed into the Catawba River (near present-day Morganton). He was the head of the American branch of the *Unitas Fratrum*, or the Moravian Church, as it was and still is known. He was the leader of a party of five that had left Bethlehem, Pennsylvania, the previous August to survey and select land for a new Moravian settlement. The land he would choose would ultimately become known as Winston-Salem.

As he sat by the rushing stream he jotted down some impressions of the day's journey. "The land is very rich," he wrote, "a fine piece of land lying on two creeks." He referred to another tract he had seen a mile to the west and then he noted: "The wolves here give us music every morning, from six corners at once, such music as I have never heard."

The fact that wolves once prowled in North Carolina may be surprising to some. Wolves today are confined to the far north and to shrinking pockets of habitat in Michigan, Minnesota and Montana. They seem truly to be a wild, exotic beast, not a home-grown animal at all. For many they may also seem to be a half imaginary animal, a queer blend of fact and fiction mixed in youth. From childhood stories like "Little Red Riding Hood" and "The Three Little Pigs" we've picked up more ideas about wolves than we may care to admit.

But wolves were once as common in the forests here as the white-tailed deer or the great horned owl. The wolves are gone now, of course. You could shake the state like a towel and a lot of strange things would fly out, but a wild wolf would not be among them. Nor would a mastodon, for that matter, another extinct creature that lived here once. But where the last mastodon expired some 50,000 years ago, the last native wolf died only recently. And where the mastodon entered oblivion without a human to comment, the wolf has left a trail behind



Courtesy of the Moravian Archives, Bethlehem, Pennsylvania (Hermhut Collection)

The howls of the gray, or timber, wolf once rose above North Carolina forests before wolves were exterminated in the nineteenth century. Wolves ran afoul of early pioneers because they attacked precious livestock. Colonial documents carry a wealth of information about settlers' problems with wolves. Moravians who built the villages of Salem, Bethania and Bethabara, pictured here in an eighteenth-century drawing, constantly wrote about wolves and the damages they caused.

on its way to extinction. It's not a trail of tears, but a trail of words — words of superstition, anger and fear.

The words, and the pictures they create, are all there, in the documents and papers that survive from colonial times. They are fascinating records. In shivery anecdotes and pained complaints, in the legal language of bills considered and laws passed, the early settlers paint us a vivid portrait of the wolf in their lives. The wolf may have died out in North Carolina, but its prints are still fresh in these documents.

Perhaps none of these records portray the wolf's presence as richly as the Moravian *Records,* a collection of diaries, memorabilia and minutes of meetings that document the Moravians' daily life in North Carolina for over 100 years. The Moravians were a Protestant religious sect that arose in Bohemia (in modern-day Czechoslovakia) in the 15th century, and resurfaced in 18th-century Germany after a series of persecutions. In 1735 some of its adherents began a settlement in Savannah, Georgia, and then, when Indian wars drove them out, they moved to Bethlehem, Pennsylvania. From there a band struck out into the Carolina frontier.

They were a pious and industrious people, dedicated to the ideal of service — to each other, to their neighbors, and to the Indians that populated the wilderness around them. And they were careful record keepers, not only of the institutional kind — births, baptisms, weddings, deaths, funerals — but of the homely affairs of everyday life: crops planted and harvested, buildings completed and burned down, roads built, game killed. They wrote about Indian raids, rowdy hunters in their tavern, rebellious young people, important visitors — all the minutia of life in the settlement as it grew from a notch in the forest to a thriving community.

The wolf stalks these records, and you can scent the fear it provokes.

It's the gray wolf we're talking about. *Canis lupus.* Master predator. On a map showing in black the distribution of the gray wolf in North America before European settlement, the only white area would be a thin line in California. Its range extended north to the Alaskan islands and south to Mexico City. The gray wolf weighs 80 pounds on the average, but it can go larger. Its head is larger than a dog's; its feet are, too, but its chest is narrower than a malamute's. Two layers of fur ward off the cold, and its coat ranges from gray to black. One third of its life is spent searching for food. It travels 30 miles a day and has been observed running behind swift-moving caribou for five or six miles before attacking. Its 42 teeth can exert a bone-crushing pressure of 1,500 pounds per square inch. It'll eat five to 10 pounds of meat a day.

Social animals, wolves travel in packs of five to eight, although packs can get larger. The alpha male is the dominant member of the pack, although the best hunter may be a young female. Males share the responsibility of raising their large litters of six or seven young. Wolves are affectionate and playful with each other, engaging in nuzzling and licking, playing tag and prancing about. In his superb book, *Of Wolves and Men,* Barry Lopez tells of an incident in which three wolves crawled on their bellies toward a flock of pintails on a meltpond. Suddenly they charged the ducks and the pintails lifted off the pond well before the wolves arrived. "The wolves cavorted in the pond, lapped some water, and were gone," Lopez writes. "It was all a game."

These were the wolves whose howls tingled the spines of the Moravians as they carved their settlement out of the forest: social creatures, perfectly adapted to their wilderness habitat, superb predators.

It was their predatory dispositions, of course, that caused problems. Indeed, even as Bishop Spangenberg plotted the land that became the Moravian settlement of Bethabara, he was making plans to exterminate the wolf from the region. "A couple of Brethren skilled in hunting would be of benefit not only here but at our other tracts, partly to kill the wolves and panthers, partly to supply the Brethren with game," he wrote in his field notes. It didn't take the Moravians long to begin their program.

On October 8, 1753, 15 single Brethren began a journey from Bethlehem to Bethabara. They arrived on November 17 and sang a song thanking God for their safe arrival. "While we held our Lovefeast the wolves howled loudly, but all was well with us. . . ." The Brethren had names like Bernhard Adam Grube and Friedrich Jacob Pfeil and Hans Peterson, and they were not long out of countries like Germany and Norway. One was a tailor, another a surgeon; there were farmers, a baker, a shoemaker, a millwright. Once in Bethabara they set about clearing the land and building a road. And on one cold January day in 1754, as the Moravian diarist noted, "Two went half a mile from here to dig a wolf pit; there are many wolves about and our cattle are in danger."

The other human inhabitants of the North American wilderness, the various Indian tribes, had co-existed with wolves and panthers for centuries. Why then did the European settlers strike out so immediately against them? One answer, as the Moravian records make clear, was to protect their livestock. The Indians originally had no livestock; the settlers did. With the slim purchase settlers had on the heavily forested land, often years were necessary before the trees could be cleared and pasturage established. In the beginning hogs, cattle and sheep were allowed to run wild in the woods with only an earmark to denote ownership. They were thus easy marks for wolves and other predators like panthers.

But the answer is really more complicated than that. The Europeans' attitude toward wolves was based on centuries of inherited fears and superstitions. There were wolves in Europe and Bishop Spangenberg, and many others, were familiar with them. "They are not like the wolves of Germany, Poland

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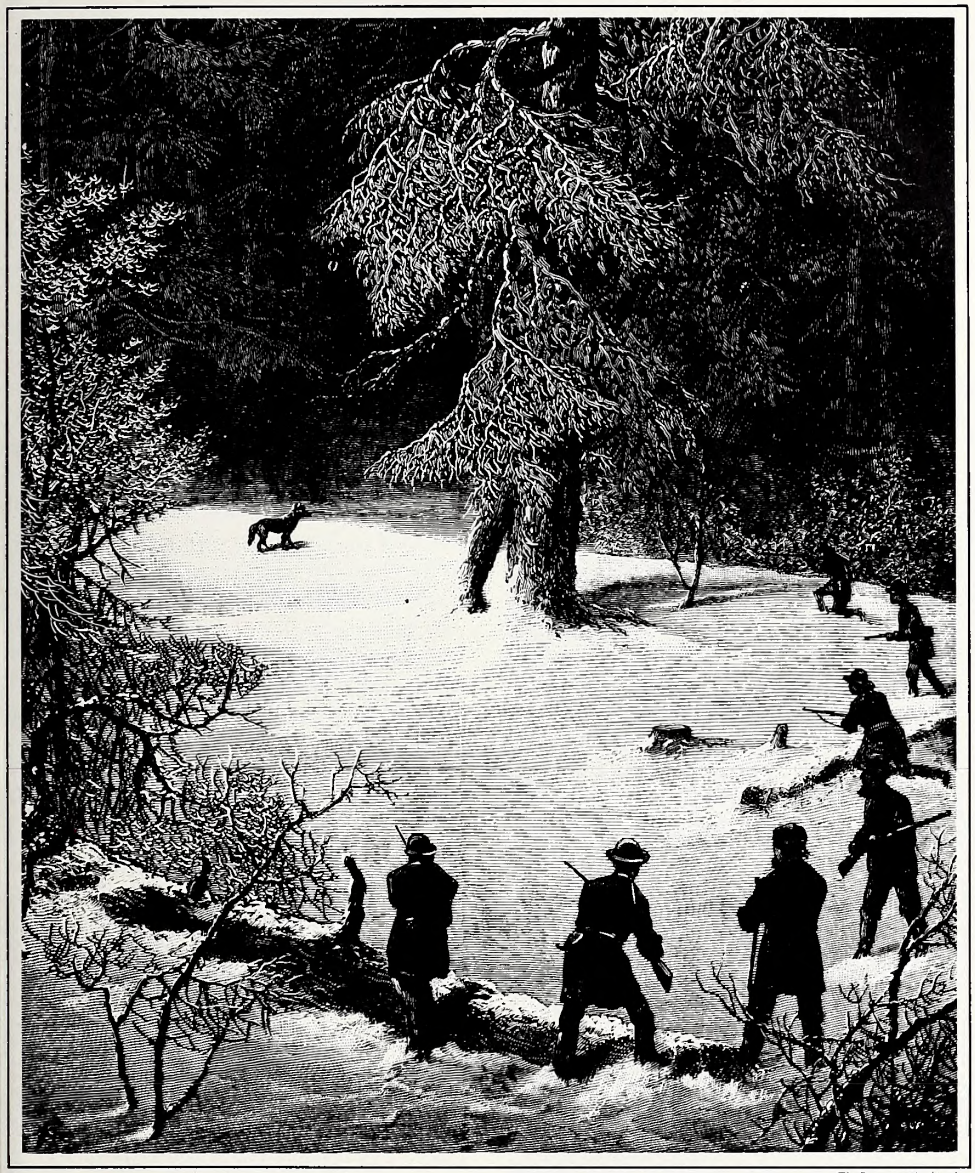
Wolf bounties were common in most colonies, including North Carolina. Settlers were encouraged to kill wolves and they did it by trapping them in pits or by hunting them down with dogs and guns, both methods shown here in old magazine engravings. Settlers grew skilled at tracking wolves down to their dens and then killing the adults as well as the pups. The last wolf sighting in North Carolina was in 1933. Another 19th-century engraving (lower right) shows a man attacked in forest by wolves. Fanciful drawings like this often distorted reality, for wolves were fearful of men and ran from them.



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and Livonia," he observed in his diary about the wolves of North Carolina, "but are afraid of men and do not usually approach them." In European folktales the woods was the domain of the beast. In countless tales and fables the wolf symbolized cunning and cruelty. It threatened children and even ate grandmothers, as in the story of "Little Red Riding Hood." Wolves huffed and puffed and blew little piggies' houses down. Bitten by wolves, men turned into werewolves and stalked the night.

Europeans were afraid of wolves. No doubt wolves attacked solitary travelers in the forests from time to time, but they were often unfairly blamed. In south-central France, between the years of 1764 and 1767, two wolves were reported to have killed 64 people, most of them children. The fear of these wolves led to a rampage of wolf-killing, and over 2,000 wolves were slaughtered. One investigator maintains that in many instances, as in this one, rabid dogs or hybrids were the guilty parties. Again, the best source on the complex attitudes of the settlers' toward wolves is Barry Lopez.

When they set out to rid the forest of wolves, the Moravian settlers duplicated the experience of just about every other European group along the eastern seaboard. As early as 1630, for example, Massachusetts established a bounty on wolves and Virginia followed suit two years later. By 1669, the Virginia Burgesses were requiring tribute from a group of Indians in the form of 145 wolf scalps a year.

North Carolina established its first wolf bounty in 1748, "An Act for destroying Vermin in this Province." By the articles of this act, 10 shillings were offered for every wolf or panther scalp or head. For the scalp of a bobcat, a lesser scourge, a hunter received two shillings and six pence. For at least the next 30 years laws were passed perpetuating these bounties and extending them throughout the province. In 1773, for example, the wolf-bounty act identified the counties of Bute, Orange, Anson, Granville, Tyrrell, Chatham, Wake, Mecklenburg, Guilford, Onslow, Carteret and Surrey as being "much infested with wolves." The following year another act extended the bounty provisions to Brunswick, Rowan, Currituck, New Hanover, Tryon, Bladen, Cumberland, Pitt, Duplin, Dobbs, and Johnston counties.

There is some evidence that wolves weren't being killed fast enough to suit some people. When the General Assembly of 1777 met in New Bern, a farmer wrote to the North Carolina Gazette suggesting

that the Assembly increase the wolf bounty. "Among the many losses that attend the planter and obstruct his success," he wrote, "perhaps none are more so than the damage done by wolves, and other noxious animals, among our cattle, sheep, and hogs, and it is known that colts and horses frequently become the prey of such.

"As private subscriptions made for the encouragement of the vermin-killer are seldom half or even quarter collected and paid, few will now be induced to give up their time for the purpose. . . . I would propose not less than five or six pounds for every wolf killed."

The legislators did increase the bounty that year to 20 shillings for every "grown wolf," and 10 shillings for every young wolf. To collect his bounty, the wolf hunter was to present the scalp to a magistrate within a particular parish and swear that the wolf had been taken in that region. The reason for this was that local taxes were levied for wolf bounties, and no one wanted to see local monies go to the extermination of wolves killed elsewhere. Of course there were some who tried to take advantage of the law. In 1754, the General Assembly complained that the bounties had encouraged "several idle stroling Persons to hunt and range without the inhabited Part of this Government to kill the said Vermin, thereby to intitle themselves to the . . . Reward, to the great Grievance of the Parishes lying to the Westward."

Wolves were hunted in a variety of ways — by pits, probably the simplest method, guns or dogs. Wolf pits were fairly well-known in Europe, but most probably settlers drew on Indian methods of pitting wolves. The eminent painter John Audubon witnessed a wolf pit in operation in the 1830s near the Kentucky-Indiana border. It was probably similar to the ones used by the Moravians. The pit was about 8 feet deep with a broad bottom so the wolf could not climb the sides to escape. Over the pit was a thin platform of twigs on a central axis. The hunter placed putrid venison on the platform as his bait, and the wolf fell through the light twig covering. Audubon accompanied his host as he went to check his traps one night. There was a live wolf in one. Audubon looked on in amazement as his companion jumped into the pit with the wolf, slit its principal tendons, hauled the frightened animal out of the pit with a rope, and then left it to the dogs.

The Moravians caught their first wolf more than a year after they dug their pit. On February 2, 1755, the diarist noted simply: "Today we caught the first wolf in our wolf pit." Wolves continued to bother the Moravians as the years went by. Bethabara grew, a new settlement, Bethania, was formed and still another, Salem. North Carolina became a state in the newly formed union of the United States. Great events and small matters were noted in the Moravian diaries, but a constant refrain throughout is the matter of wolves.

Oct. 30, 1755. The night was very cold, and many of the party were disturbed by the terrifying howling of a wolf.

March 15, 1757. Wolves have killed many of our calves this spring.

July 11, 1764. Today a wolf attacked a flock of sheep grazing in the woods near the Tavern pasture, seized a wether and made off with it. The shepherd gave an alarm, the day-laborers working on a near-by farm came running, and the wolf dropped the wether, which was brought in still living, but had to be killed.

July 4, 1769. Last night a large wolf was caught in the trap near the brewery; the night before the wolves came into the land behind the shed, and would have fallen into the sheep-fold had not the baying of the dogs brought people to drive them away.

May 1, 1790. Wolves have been very bad in the neighborhood and have even attacked men. Today and again on the 15th a wolf hunt was organized and 6 young wolves were captured.

Nov. 4, 1803. About 10 o'clock in the evening wolves made such howling near the town that it was terrible to hear.

May 31, 1805. It should also be noted of this month that wolves have done much damage on the farms of some of our Brethren living near Salem, killing nearly all the sheep. Many of our Brethren and neighbors formed a company to get rid of them, contributing money out of which four dollars was to be paid for each old wolf killed within eight miles of Salem whose scalp was brought to the treasurer of the company, and two dollars for each young wolf. Three young wolves were captured alive between here and Bethabara; an old wolf was shot and badly wounded so that it probably died though it was not found. Since then the destruction of the sheep has ceased.

By 1807 references to wolves in the Moravian records had almost entirely ceased. The reader finds continued reports on the weather and local happenings, new buildings constructed and the like, but of the animal that had ravaged their livestock there is almost no mention. Perhaps there were other matters of more importance to the diarists. The area was growing. Farms were spreading throughout the region, and along the Yadkin and Dan rivers. But without a doubt the years of persistent harassment were beginning to take their toll on the wolf population.

The wolf in North Carolina — and the pattern was a common one throughout the country — was caught in a whirlpool of circumstance that was hastening it to its doom. It wasn't only that hunters were growing more deadly with their methods, tracking wolves to their dens to kill the young, developing specially bred wolf dogs to track them and attack, making steel-jawed traps and mixing poisons. The wilderness was shrinking under the advance of settlement and as the deer populations fell, the wolf's natural prey, the wolf was forced to turn more and more to livestock for its food supply. This intensified the efforts of the settlers to extirpate the wolf.

By the 1880s the gray wolf, once the master predator of the North Carolina wilderness, had disappeared throughout its former range. Periodic reports had it in remote mountain areas. In 1903 the taxidermist C.S. Brimley was told that "wolves still occurred sparingly in Graham, Cherokee, Buncombe, Caldwell, Yancey and Watauga counties." By 1912 they were said to be extinct in the mountains. According to records, the last sighting of a gray wolf in North Carolina occurred in 1933.

And so the wolf passed from the North Carolina scene, as it has passed from almost the entire United States. It's not the only animal to become extinct in our state. The buffalo wandered west along with the elk, and the passenger pigeon and Carolina parakeet disappeared as has, most likely, the panther. But the wolf has left its mark behind, as have few of these animals, with the possible exception of its predator kin, the panther. Its mark is found in place names throughout the State, in the letters and papers of our forefathers that detailed the wolf's outrage and their fears, and in the laws that hastened its end.

The wolf's demise coincided with North Carolina's rise and it's difficult to see how the outcome could have been much different. But it bears reminding once more that we've lost something. The howl of a wolf was once as clear a call of the wild as there's ever been, a symbol of freedom and fearlessness and alien power. Now it's the booming of the great horned owl and the raucous chatter of a pileated woodpecker that carry the burden in the wilderness symphony. But it's lighter music we're hearing. Strauss, perhaps, but not Beethoven.⊠

Sly Like A Fox

Celebrated in fables, the red fox is a curious beast that may not even be native to North Carolina.

by Rick Estes photography by Eugene Hester

The red fox is many things to many people. To some, he is Uncle Remus' sly and deceitful villain. To a student of nature, he may be the embodiment of all that is good in the wild. To some, he is a fine game species; to others, a source of prime fur. Indeed, the red fox is all of these things. Yet, perhaps most of all, he is a creature which will always be a fascinating enigma.

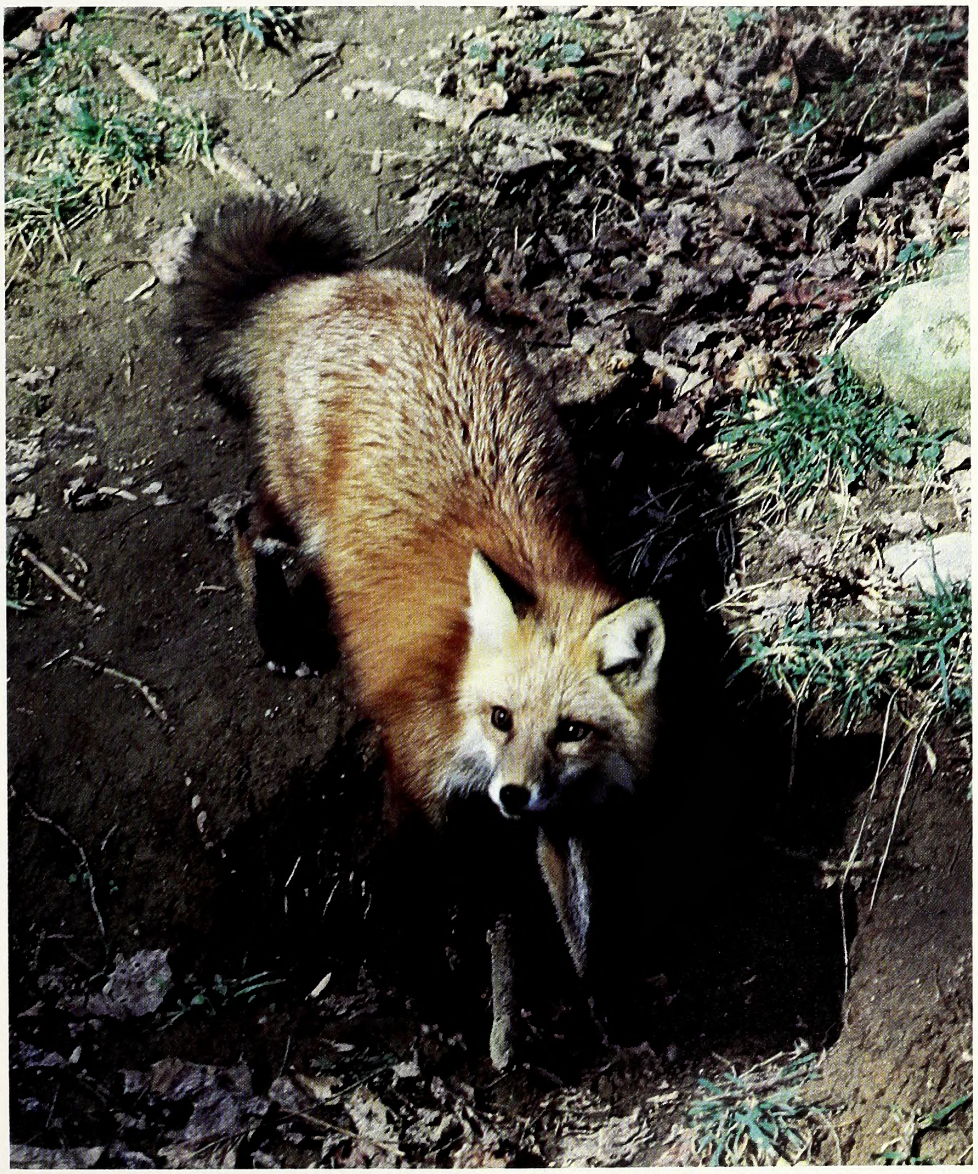
Even the experts disagree on some of the basic facts about the red fox. Some guide books to North American mammals list his scientific name as *Vulpes fulva,* while others call him *Vulpes vulpes* (now most widely accepted). Some authorities say he is rarely seen by humans because he is mostly nocturnal, while others say he is often seen abroad in daylight.

To be sure, the red fox is one of our most interesting wildlife species. Written about in countless books, he has been credited with some fantastic feats of intellect and cunning — some provable and some simply products of an overly active imagination. Fox hunters tell of red foxes crossing a busy highway while running from hunting dogs, then stopping to sit and watch their pursuers tangle with the speeding cars.

One incredible story credits red foxes with developing a clever trick for ridding themselves of fleas. Supposedly, a fox will back slowly into a pond or creek while holding a stick in his mouth. The fleas advance toward the fox's head to escape the rising water, and finally wind up on the stick. The fox then ducks his head and releases a stickload of fleas. That kind of tale — while highly suspect to say the least — is a good example of the kind of cunning often attributed to foxes. The quick, furtive nature of the red fox makes him a natural subject for such tall tales.

But even the truth about the red fox can be elusive. For example, experts have debated for years whether he is native to North Carolina. Even some experienced wildlife biologists and researchers are surprised to learn that the origin of the red fox in North Carolina is still obscure.

Based on early accounts of European explorers to North America dating from around 1600, we know that gray foxes (often called black foxes by the Indians) are indeed a native species. But there are no early records, either written or fossil, that clearly establish red foxes south of Rhode Island before the European red fox was imported for sport hunting during colonial days. Biologists generally agree that some species of red fox was native to New England prior to settlement there, but little is known about its population, range or abundance.



The red fox more than makes up for its lack of speed with cunning and trickery. It'll double back along its trail, run along rocky walls, and take to water to escape a pursuer. It has been known to build underground tunnels with 27 exits.

Early English colonists, intent on bringing their favorite sport with them to the New World, soon learned that the native gray fox was a poor substitute for their red. They began importing pairs of red foxes to New England as early as 1650. The earliest records of red foxes brought to North Carolina from Europe date from 1740.

The fact that red foxes are now common throughout most of the Southeast is due in about equal measure to these imports and to changes in habitat. The red fox is a creature of forest edges and open country. The original primeval forests that

prevented the spread of the red fox from the Northeast gradually disappeared as settlements spread south and west. Evidently, imported European red foxes bred with those already existing in the Northeast, and the "new" species spread as a single, "native" population.

About 165 years ago, these foxes were given the scientific name *Vulpes fulva,* but more recent research has indicated that the North American red fox is so similar to other red foxes that its original name, *Vulpes vulpes,* has been restored.

The differences between red and gray foxes are much greater than between the various subspecies of the red. Still, some people confuse the two, probably because both can have some reddish color. Actually, the color of the red fox varies from a deep rust to a pale yellow. His feet and lower legs, nose and backs of his ears are black. The tip of his tail is white. The gray fox is gray along his back with reddish underparts and a black-tipped tail.

In addition to the shading from red to yellow, the red fox also has two distinctive color patterns that have names of their own — the "cross fox" and the silver fox. The cross fox pattern — a color pattern of the red fox — is a brownish red color, but it also has a darker stripe running lengthwise down the back that is crossed by a similar stripe just behind the shoulders. The silver fox pattern has a very dark red coat that may appear almost black, yet there are enough white-tipped guard hairs to give it a silver appearance. Regardless of the color phase, however, the red fox always has a white-tipped tail. The gray fox's tail has a black mane on top.

There is little difference in size between red and gray foxes. Both stand about 15 inches at the shoulder and average over 40 inches in length, including the long, bushy tail. An adult red fox may weigh from 8 to 15 pounds, and the males are usually slightly larger than females.

The red fox's footprints are usually less distinct than the gray's, especially in winter, because the pads are more heavily haired. Red fox scat is often paler in color than that of the gray, because grays eat much more vegetation, particularly berries. And while grays use dens all winter, red foxes only den after breeding and abandon the dens by early fall when the family begins to disperse.

Red and gray foxes also differ considerably in habits and habitat. The red prefers forest edges and open country, but the gray is a creature of the woods. As our forests give way to land clearing and a more open terrain is created, red foxes may have an advantage over grays. While both species exist throughout North Carolina, the gray is more common and is most abundant in the east. Red foxes are more abundant in the western part of the state.

One reason the gray fox is considered inferior to the red as the quarry of a pack of hounds is his tendency to climb trees. Grays will often climb when pursued, and they also go into the trees to eat fruit, especially wild cherries. They cannot scale a trunk like a squirrel, but if the tree is leaning or has low limbs, gray foxes will not hesitate to go aloft for safety or food. The red fox, on the other hand, apparently prefers not to climb, and will use only its swiftness and cunning to escape.

Foxes have been a favorite subject of writers and storytellers since the early days of man. The earliest written account of the stick-full-of-drowning fleas story has been traced back to Olaus Magnus, the Swedish historian who lived between 1490 and 1558. Evidently, the term "historian" had a different meaning in those days!

Indian legends abound with stories involving wily foxes, as do those of the native peoples of every land shared by humans and foxes. Most of these legends have been told and retold so many times that they bear little resemblance to the originals. That probably matters little, however, since the original tales were usually more fancy than fact.

But the oft-repeated tales of Uncle Remus and the "sour grapes" fox from Aesop's Fables have certainly muddied any clear view of these interesting creatures.

Nor do ancient storytellers have a corner on the tall tale market when it comes to foxes. Modern sages are passing along some of their own. One of my favorites is told by several different fox hunters. It seems a pack of fox hounds struck a red fox trail just after dusk and ran it until the next morning. The fox finally gave out and collapsed in the middle of an open field. When the dogs caught up with him, they, too, fell from fatigue. The fox hunters eventually found the dogs sleeping in a circle around the sleeping fox!

Fact or fiction, friend or foe, the fox is apparently with us to stay. Through the years, he has proved resilient and adaptable to man's changes in the environment, as well as rising and falling prices on his fur. Even bounties on fox skins have had little lasting effect on fox populations.

Still the current status of foxes in North Carolina — both red and gray — is the subject of much discussion. Fox hunters, who may thrill only in the chase, claim the fox population is low. On the other hand, fox trappers talk of the need to control the

Unlike the gray fox, the red fox is probably not native to North Carolina. Most likely it was brought here by early fox hunters or moved into the region from the northeast. The red fox likes edges and open fields; the native gray fox likes timbered and brushy areas. Gray foxes are most abundant in the east; red foxes are more common in the west.

number of foxes. Some poultry farmers and small-game hunters blame foxes for depredations on their livelihood and sport. Apparently, few people have a "take 'em or leave 'em" attitude about foxes.

This durable interest in foxes finally led the 1979 legislature — at the urging of fox hunters — to pass a law making it illegal to take foxes with gun or trap. Running foxes with dogs was allowed year-round. This did not prove to be universally popular, so in 1982, the General Assembly passed another law stating that any county providing a petition signed by 15 percent of the resident licensed hunters and trappers could request that the N.C. Wildlife Resources Commission determine whether the county should allow the taking of foxes. To get an estimate of the minimum fox population density in a county, wildlife biologists use scent stations and track counts. A scent station is simply a smoothed, flat, 3-foot circle of ground. A thin layer of agricultural lime is spread within the circle, and red fox urine is placed in the center.

Biologists check the station for tracks, which imprint nicely in the lime, on the morning after the station is set up. By following the tracks leading to and away from the station, they can get a count of the number of foxes that visited.

Sites for the stations are located in good fox habitat, away from residential areas where domestic animals might interfere with the tracks. A 25 percent sample of the county's fox habitat is used, and one station per square mile is set up within the sample area. Total number of stations per county has ranged from 70 to 175.

Prior to these studies, Commission biologists conducted a four-year research project in every county of the State to determine fox population trends on a regional basis. For this project, two scent station lines with 10 stations each, were established and checked in each county. This kind of study was not intensive enough to actually measure fox populations, however.

Based on the results of the studies, the Commission can propose a hunting and/or trapping season, or recommend a continuation of the "no-taking" law for that county. Those recommendations must be made at a public hearing in each county where studies have been completed.

The array of regulations, State laws, local laws and regulations applying to foxes in North Carolina has prompted one authority to comment: "Foxes live in a legal jungle." Based on past history, that might make little difference to the fox. He has proved he can get along pretty well.

The Winter Coast

There is stark beauty in the loneliness of our coast, especially during winter's low ebb.

by Lawrence S. Earley

And for ye season it was winter, and they that know ye winters of that country know them to be sharp and violent, and subject to cruel and fierce storms, dangerous to travel to known places, much more to search an unknown coast.
— William Bradford, *Of Plymouth Plantation* (1630)

NORTH RIVER OSPREY Curtis Wooten

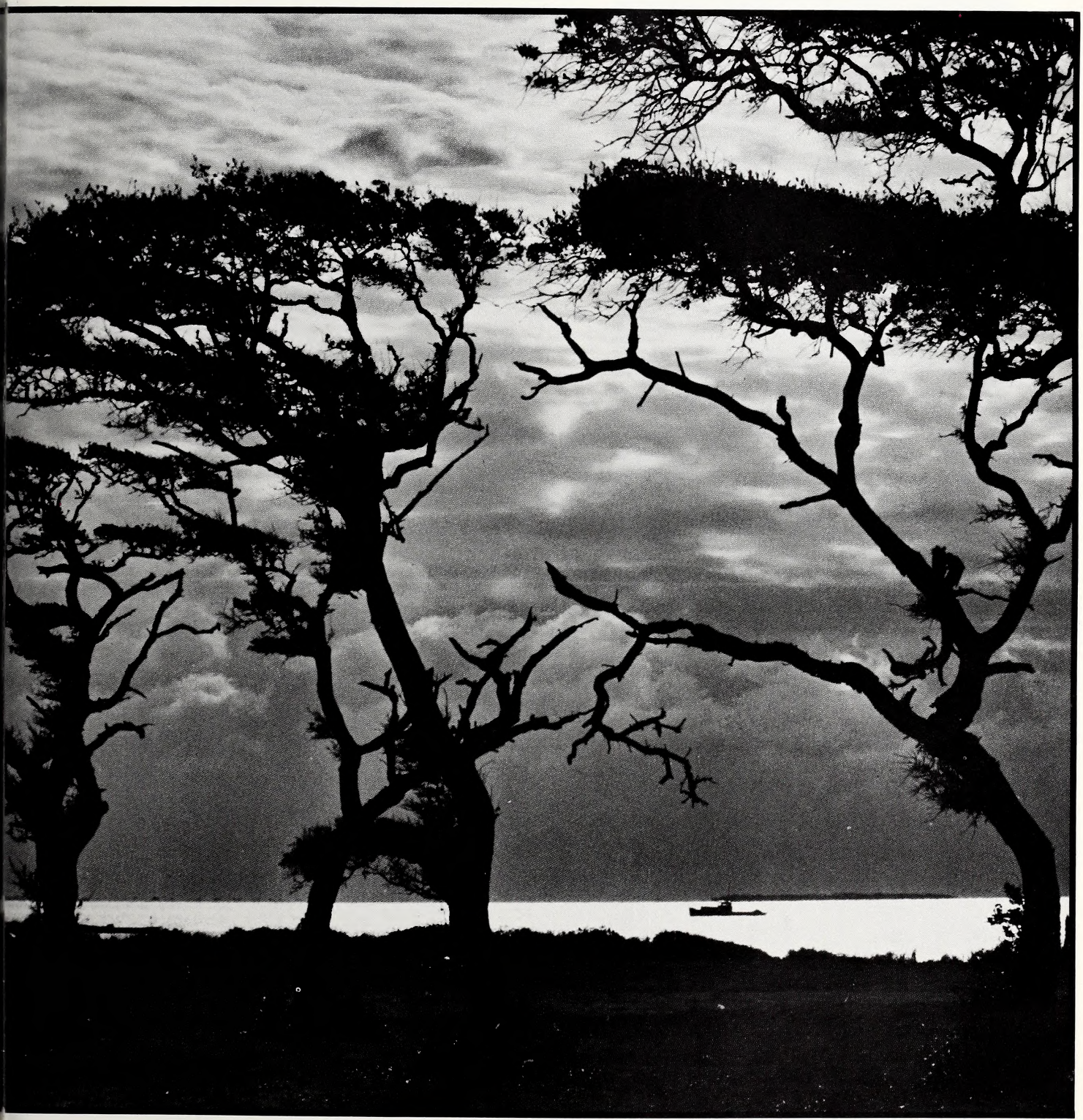
Magic names, these: Carolina Beach. Atlantic. Wrightsville. Topsail. Salter Path. Sunset. Surf City. Some of the great names in the annals of Tar Heel frisbee-throwing and beer drinking. Names with a lot of wattage for those seriously afflicted with a terminal case of suntan fever. You hear this roll call and you can almost hear the thin crackle of bodies basting in sunscreen, taste the salt in the air, feel the grit of sand in your palms. "Under the boardwalk, down by the sea . . ." Mention these names and your eyes reflexively squint at the brightness of a noonday summertime sun at the beach.

But look at them now, these epic beaches of our summer memories. There are no more desolate stretches in all North Carolina at the moment. We've abandoned the winter beach as if a plague were brewing there, as if chains barred us and signs sprouted all about saying: "Quarantine — Serious Disease." "Stay Away! This means you!" The concessions are boarded and locked, the honking juke boxes are as silent as Egyptian tombs, and the sand is smooth and virginal, unmarred by human footsteps. A litter basket bolted into the sand looks as ridiculous in this Empty Quarter as a Dempsey Dumpster in the Sahara.

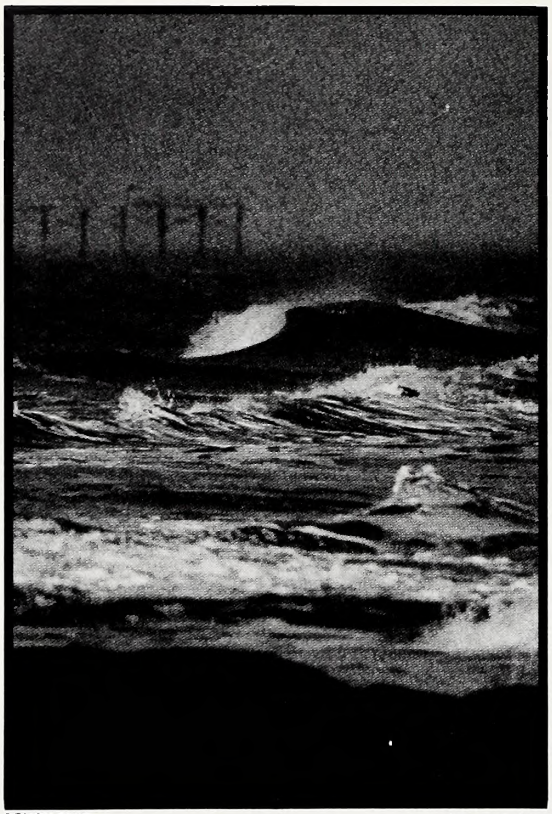
Where is everybody? I strip off my Irish-knit sweater, prop myself up in the sand and survey the emptiness. In the trough of the waves a long column of brown pelicans undulates gently, surfing the wind. It's 70 degrees Fahrenheit on this January day which is a little unusual. But then again you never know what to expect at a winter beach. It could drop 50 degrees and be snowing tomorrow. Which would be more like it. Which is what we expect on a winter beach.

Along the coast winter is a pirate cutthroat, not just another season. It will board you, strip you naked and make you walk the plank unless you're careful. Try walking the beach in a gale wind while a

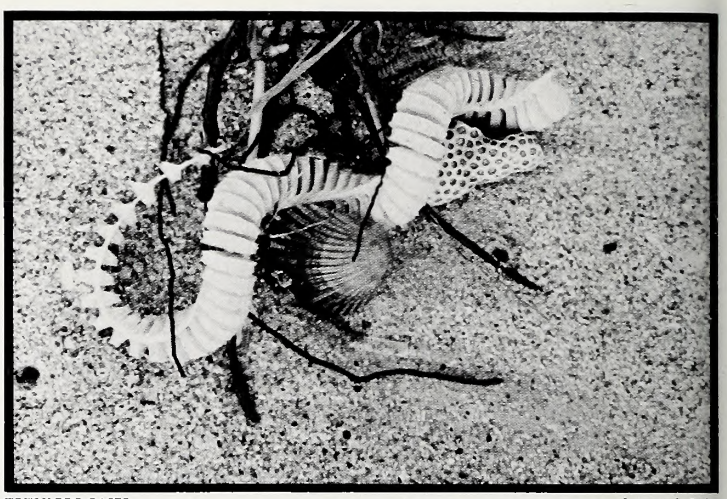
HARKER'S ISLAND LIVE OAKS



Curtis Wooten

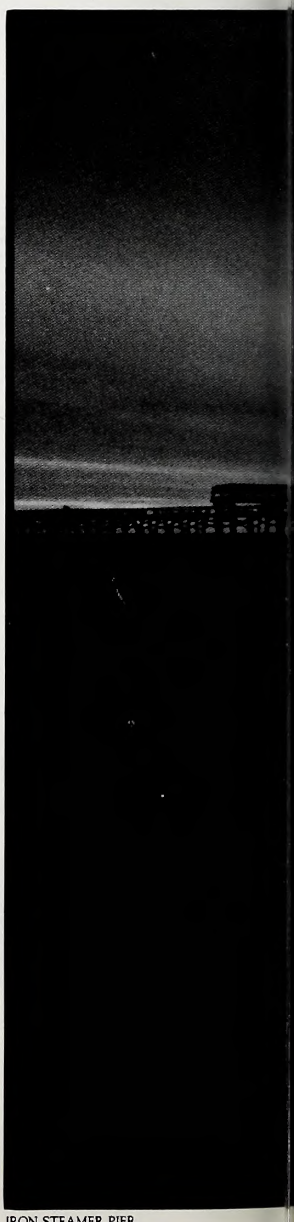


ROUGH SEAS *Laurence S. Earley*



WHELK EGG CASES *Laurence S. Earley*

PELICANS IN THE SURF *Laurence S. Earley*



IRON STEAMER PIER

thunderous surf bashes the sand. The shrieking winds will do more than muss you hair. They will knife through the down or Gor-Tex or whatever substance you choose to put between you and the elements. They will drive racehorse clouds above you the color of pitted steel and weathered iron. There will be a salt spittle hanging on the edge of the wind and the scene will be elemental, harsh and primitive, with a dim forboding as if weird witches were boiling up some trouble in their bubbling cauldron of the sea.

This is no summer scene.

The winter coast has a different personality. It can be frightening, especially when a storm boils up from Texas, busts along the Gulf coast, and races through Georgia and South Carolina to hit Hatteras like a sumo wrestler. You'd best not be found along the coast on occasions like these. But even when winter storms are not riling the ocean, the action along the beaches is in fact very different from that in summer.

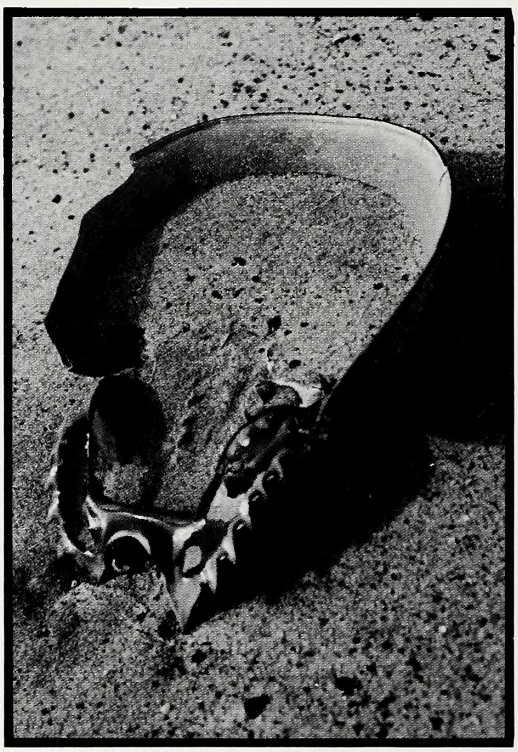
In summer waves are long but they are not very high. They roll up the beach and push sand in front of them. Summer waves make beaches. Winter waves, churned by high winds, by the dreaded nor'easters, are steeper. These steep waves keep the sand in constant suspension, not allowing it to settle, as if it was afflicted with St. Vitus disease. Sand is pulled away from the beaches. Beaches are eroded. Winter waves pin new addresses on the sand and send it packing. That's why winter storms are so destructive and why summer vacationers are always amazed at how much the beach has changed since the last time they were there. One winter a couple of back-to-back nor'easters totally stripped the sand from Virginia Beach.

The winter beach is a battleground and in a gale you can experience it all — shrieks and whines and explosions and the harsh sting of tears. So we flee the coast after the summer, abandoning the beaches to the gulls and the crabs. And there's some precedent for this retreat. Coastal Indians went to the beaches in summer and had a pretty fat time of it, though without surfboards and hot dogs. They'd feast on oysters and fish and live high on the hog. But come the first hint of cold and they'd retire to the inland forests to hunt during the winter months.

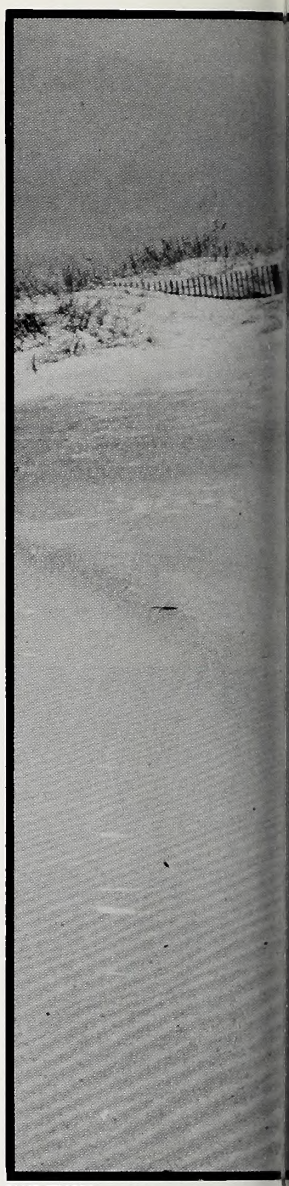
Even the fish schools that ply the coast don't want any part of the turbulent winter. They migrate to warmer latitudes or plunge into the warmer, deeper waters along the Continental Shelf. Blue crabs ride out their winter covered with mud at

Curtis Wooten

SEA OAT Curtis Wooten



HORSESHOE CRAB SHELL Curtis Wooten



SAND FENCES

the bottoms of sounds. Only waterfowl seem to deliberately seek out our winter coastline, although most prefer the safer confines of bays and shallow-water sounds to the open seas.

Is there some reason to resist this seasonal retreat and, taking a lead from waterfowl, deliberately seek out a winter beach? I think so. I think it would do us all some good to be required to walk the beach in winter, feel the tumult of the surf, feel the very beach shifting under our feet. Do us some good to confront that black-patched cutthroat and see what he's made of, see what we're made of. There might even be something to be gained, on a morning prowl in December, by climbing into our essential loneliness like a monkey into a tree; by feeling fear tighten our throats as the sea howls and the wind buffets us.

Anyone who breasts a winter gale on a beach and experiences the godawful turmoil all about will think twice before building a condominium on the beach. That's for sure.

We're coddled with too many illusions — that life is a womb with a constant temperature of 70 degrees F. winter, spring, summer and fall. People who sell us our central air and heating units tell us that, but it's not necessarily true. For a nation with pioneer roots we're too much bound to home. We need some adventure, some risk, some roughness in our lives. Our idea of nature needs to be enlarged to include the thorns as well as the rose, the gale as much as the breeze, the winter beach along with the summer beach. We need a healthy dose of solitude if only to experience fear and awe, that confrontation with something larger than we've known.

Each of us comes from stock that knew this in a very personal way. Stand at Cape Hatteras and peer out at Diamond Shoals and it may come to you. This coast is called the "Graveyard of the Atlantic," and with good reason. More than 600 ships lie in the turbulent waters offshore, many of them foundering in an attempt to find a channel into shifting inlets to ports upriver. Stirring at the bottom along with cargoes of tobacco and timber there are the uneasy bones of men and women who wanted a better life and would have reached it but for a careless captain or 30-foot seas.

Perhaps it takes as much courage or more for us to put ourselves in the way of risk and discomfort today — hiking on a mountain trail, for example, or standing motionless at dawn waiting for the moment of grace and heart-stopping magic when the buck takes his first step into the clearing. Or even walking along a clamorous winter beach.

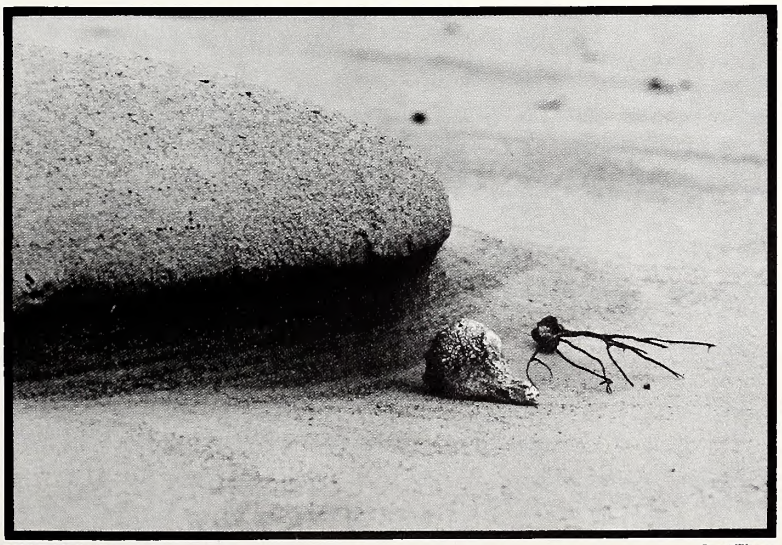
We go to the beach at the wrong time, it seems to me, when it is crawling with the restless tides of humankind rather than when there is a chance for solitude and reflection. On the winter beach solitude is

Curtis Wooten

there for the taking. You'll witness beach-moving in progress, hear the eternal cries of gulls. In such conditions don't be surprised if something happens, a resolve or an idea popping up like a crab from some long forgotten burrow in your soul.

Hey, I'm not knocking summer beaches. They're fine if taken in moderation. And if you think about it in a certain way spring is almost here. Why even now, in the depths of the grassy Sargasso Sea, eels are gathering to spawn and soon some ancient urge will point their offspring north toward Tar Heel estuaries. In the fishy brains of herring and rockfish there's a catchy little number playing that, roughly translated, goes like this: "Nothing could be finer than to be in Carolina . . ." So hang on, diehards, it's almost time to boogy at Topsail.

In the meantime the winter beach is okay by me. ⊠



SCULPTED SAND

Curtis Wooten

Every quail hunter has one hunt he remembers above all others.

The Perfect Bird Hunt

by Mike Gaddis

"If you could relive just one day of all those you've spent bird huntin', which would it be?"

I had heard the question before. The difference this time was who was being asked. Harold Britt is a bird-hunting legend in the Giddensville part of Sampson County. Most anyone there will tell you that. And it goes further. There was a time when Winchester and Stevens vied for his services to put their best clients into some top-notch North Carolina bird hunting, and a time when he supplied top-flight dogs for their exclusive plantation hunts in Georgia and Florida. Quail hunting has been his life's passion for 40 odd years. When somebody wants an answer to something like that, there's a lot to sort through. Britt was a while thinking about it.

"There've been several I'll never forget," he began, "but if it had to be just one, it would be the morning in the fifties on Six Runs with my brother, Carroll, and brother-in-law, Frank Sutton. In all the years I've hunted, I've never seen another to match it.

"It had snowed off and on for three days running and stayed windy and cold. The ground was solid covered. But the fourth day broke clear and bright like it does after snow, and it turned warmer. We had been stuck in the house for about as long as we could stand, and that was all the excuse we needed. We loaded up and left about ten or eleven.

"We took three dogs — Ranger, Sport, and Dillon. Dillon was the best dog I ever owned. We turned out in the long narrow field that borders Six Runs Swamp. It was part laid out and part in beans that year. The only way you could hunt it was to walk to the head and then turn around and come back the same way. Cause you couldn't cross the swamp. We hadn't gone a hundred yards before all three dogs were stacked up for keeps. We knocked five birds down on that first covey rise, and mister, it was on! By the time we made the end of the field the dogs had pointed three more bevies and we had about five birds apiece.

"As I said, you had to go back the same way and we figured the hunt, as good as it had been, was over. But going back we found four or five more covies. Scenting conditions must have been perfect because I've never seen better dog work. We finished out our 24 birds and were back at the truck in less than an hour from the time we left it. So help me, that's the way it happened.

"Those birds were like us. They'd been locked up on the edge of that swamp in all that weather for three days and couldn't feed. They felt plumb light in your hand. When they finally got the chance, they flew out of the swamp and settled into that field like folks at a circus tent revival. That's the only way I can figure it."

I had listened intently, for it was an interesting story. But my attention had wandered a bit too. I was reminded of a similar hunt Sammy Giddens had told me about not long before.

"Nida and I went home to visit the folks with three days to burn," he had said. "We planned to spend a fair part of it bird hunting our old territory. We had looked forward to it for a month. But danged it it didn't start rainin' a solid downpour the first day we got there. It refused to let up right on into the third morning. I looked out the window and the fields stood in water. There was no sign of clearing. The whole world looked pitiful.

"About three o'clock it finally began to taper a bit, though it was still falling a steady drizzle. Beggars and people who have to

copyright, Mike Gaddis, 1983.

work can't be choosy. We had to be back Monday, and I wasn't going to be able to face it without getting out for a while. We pulled on the rain gear and started loading up. We had four dogs with us. Two were just beginning to settle in. The other two were seasoned. We hadn't hunted them together before because the pups forgot their manners here and there, and four dogs can be about two too many a lot of times. But they were as stircrazy as we were and we just couldn't turn any of 'em down.

"By the time we got to the place we wanted to hunt, there was a stiff north wind and it was getting colder fast. It was still raining too. I really didn't expect to do much. But it wasn't long before we were mssing a dog, one of the veterans. We started looking and after a few minutes realized we didn't have a single dog with us! There was a small pocket ahead where the field cut back toward the creek, and an old hog lot. When we made the corner we found the dogs. They were four in line, the young dogs backing the old. You don't get to see four dogs standing that way very often, young or old. You don't forget it when you do. This time was particularly gratifying, seeing the pups come into their own. We killed three or four birds on the rise.

"Not ten minutes later, we had the same thing happen. Except this time it was a turn-about, the older dogs honoring the young'uns. There's a kind of vicarious happiness you get when something like that happens, especially when all the odds say it shouldn't. We ended up with one of the best hunts we've ever had. The birds had been sitting back in the downpour and hadn't fed. When that little change came along, they were out even though it was still rough, relatively speaking."

All this came back the other day during a moment of self-critique, after I'd made a neophyte left when the situation demanded a sage right. I was thinking that after all these years I ought to know the top few things that make for a good quail hunt. I decided at this stage in my bird-hunting career, there were three. Certainly, weather is one of them.

There are days that are just too pretty to spend bird hunting. I mean to say you'd be better off fishing. An unseasonably warm day in December, dead still with bright sunshine, does little more for bird hunting than make you sweat and wear the dogs out. The same can be said for a balmy day in February that has the spring peepers cranked up. Days like that are beautiful, no denying it. They just aren't beautiful for bird hunting.

The kind of day that makes for an outstanding bird hunt generally lies on either side of a front. If I had a pick, I'd take the last pretty afternoon before the weather began changing. Ideally, there'd be a light, steady breeze and the temperature would be in the upper forties but due to drop. Particularly if the forecast called for ice and snow, nothing would keep me from going. You can count on birds moving and feeding actively, and the conditions favor good dog work. The hunting is pleasant and easy. Close behind though, and occasionally grand, are the days which follow bad weather. It's important to be there just when things begin to turn for the better, even if the improvement is slight and short-lived. They test your fortitude, but there's nothing like being miserable and happy at the same time.

We don't get very many days like this during a season, those that offer dramatic possibilities. So what constitutes a good day otherwise? I've changed my mind about that with the years, given my own experience and that of others. For the last eight seasons, I've spent a lot of time training bird dogs and I keep a log on each day afield with things like the number of coveys, how the dogs did, and what conditions were like. Looking over it, I find that the cold windy days I used to avoid aren't so bad after all. Indeed, the facts argue that they're better as a rule than still days in a period of stable weather.

Sammy expressed it pretty well when he summed up his rainy day hunt. "The days it would seem like you ought to stay home are the days you ought to go."

Good dogs would also have to be one of the three requisites for bird-hunting success. The longer you hunt the more you come to appreciate that. There's a lot to be said for training your own. You learn things about bird behavior in the process that will make you a better hunter. It takes time and effort, but comes with adequate rewards. Beyond basic staunchness on game, the one thing I would train for most is a dog that will handle kindly to a low whistle, or a change in your body attitude. It keeps the hunt quiet and orderly and won't disturb jumpy birds. That's become more important with increased hunting pressure. It takes good rapport with a dog to get this.

There's a strong case to be made also for a dog that's broke to wing and shot. That is, one that's been trained to stop when a bird accidentally gets up and to stay in place when a covey gets up in front of his point and shots are fired. I haven't always felt this way because, like most hunters, I wasn't brought up around dogs finished that well. Bird hunting can get rough and tumble in the thickets and I haven't been sure the wing and shot thing was entirely practical. Working field trail dogs changed that because I have seen the difference it can make in practical terms. A dog only trained for staunchness that bumps a bird on the edge of a widely scattered, feeding bevy is going to flush them all before he gets through running wildly over the area. A dog steady to wing stops at first flight and stays there. The odds are greatly improved that you will get a shot. A dog that's steady to wing and shot on the covey rise will give you better shooting because the birds aren't chased into one thunderous, momentary explosion. There will be a higher percentage of occasions when the birds will get up in stages, and the lay bird will become more common.

If you buy a dog steady to wing and shot rather than train one yourself, get the trainer to tell you how to keep the dog steady. It will require extra care and attention. The best always does.

When I was a boy, my great uncle, Joel Ashworth, taught me what I would consider the third requisite for successful bird hunting. It's just that it's taken me 40 years to come to terms with it. Maybe I had to slow down a little to become even capable, and I think it's going to be a few years yet before I master it — if I ever do. But he was right: The man that kills birds regularly is a patient shot.

"You've got to take your time on the shot," he'd tell me. I always wondered just how that was possible when it seemed like all the birds were gone about the same time I got the gun up.

For 25 years, my objective was to get a shot off when the birds got up. Oh, I'd pick a bird. That wasn't the problem. It's just that I didn't waste any time shooting at it. I did kill some birds, a credit to the reflexes of youth, and I wasn't exactly a slouch as a shot. Some people even thought I was good. But I'd seen *good* shots, and I had to admit to myself that I wasn't there yet.

At 35 years, I began to notice more, and give attention to the fact that birds kept getting up after my gun was empty or that the sight picture on a careening single looked infinitely better a few moments after I pulled the trigger unsuccessfully. And that I usually killed the bird that was obscured on the rise but then presented an open shot about 40 yards out where the shotgun pattern was full.

Now at 40, I'm working hard on putting all this self-realization to practical use. I'm trying formulas like counting five before I pick my shot, and saving a shell back for the lay bird. I am getting better. Try me again at 60.

Maybe it takes a lifetime to really grow into bird hunting. To learn not only more about how to hunt, but also more about why you hunt. For most of us, it's surely not the number of birds we kill, or could kill if we had a mind to.

It's learning that while every day can't be outstanding, each has a little something special in it to make it singularly pleasurable. Perhaps nothing more than the first notes of a stirring covey at daybreak and the pleadings of scattered singles in the growing loneliness of dusk. Or the first rays of the morning sun lighting a thousand candles in a heavy frost. Just being afield with somebody you like and not caring a lick about when you get back. A crisp double on an unexpected covey rise. The heart and courage of our dogs.

All this introspection had me back near where I started. I was thinking of a day I'd like to go back for.

Don Huffman and I hunted a farm in the eastern part of the State several years ago on a day that started out gray with the somber tones that predict impending weather. We had a pointer and a setter down and the hunt got better as time wore on. Around mid-afternoon we became aware of an utter stillness, the kind that means only one thing in Nature. Maybe you've noticed. Shortly afterwards, it began with a few errant flakes and a first slight rustle of sound as frozen particles hit tinder leaves. Thirty minutes later the woods on the opposite side of the large fields we were hunting were blurred and here and there accumulations were becoming noticeable on the ground. Snowfall is a lot of things to a lot of people. To me, in the woods, it is a most wonderful thing, especially if it also happens to be the first of the year and you're behind two bird dogs.

We'd had a good day and with the birds facing rough weather we decided to call it quits. We were walking toward the truck in an old corn row between dense weeds bordering sparse patches of lespedeza. In the midst of an exuberant conversation about the snow and the hunt I glanced up to see the pointer wheel, wind, road a few feet, and firmly commit himself. His rigid posture and the setting left little room for doubt. The setter bitch came in and backed with the proud, lofty carriage I loved her for.

We let 'em stand a long time.

"Mighty pretty," Don said. He said it for both of us.

On the rise we collected four birds, two neat doubles. I've seen a number of bird hunting tableaus. They were all pretty. But as a friend has a habit of saying, "Some just remember better than others." That memory of my setter and pointer, lofty and statuesque, holding a bevy amid heavy snowfall, the first of the year, is forever indelible.

It was hard to feel any better than I did riding home that night. Until I remembered that in a few days it would be Christmas. ⊠

Volunteer Spirit Lives

Appalachian Trail To Expand

Written and Edited by Mark Taylor

Picture a national park that is almost 3,000 miles in length, covering some of the roughest terrain in the continental United States, and maintained largely by volunteers. An impossible dream? Not so! The park exists — it's the Appalachian Trail which was 60 years old last summer.

In 1968 when the National Park Service was authorized to buy the land traversed by the Appalachian Trail, many felt that this spelled the end of volunteerism for the 45-year old footpath. The "feds," hikers felt, would take over. But, with about 80 percent of the 2,095 mile trail — stretching from Georgia to Maine — on federal or state lands, trail maintainers are proving this prophesy false. The spirit of volunteerism is still strong, and the Appalachian Trail Conference, a confederacy of hiking clubs along the route, says that the Appalachian Trail may become the first property of the National Park Service that is maintained and managed primarily by volunteers instead of the government.

The Appalachian Trail project of the National Park Service has also been one of the most successful survivors of the federal budget cuts, and the volunteerism that plays so big a role in the management of the trail has certainly helped. Although administration budget requests for the trail were zero in 1982 and 1983, Congress has appropriated $15 million for land purchases along the trail over the next two years. The aim is to include all of the trail in public ownership, and this goal is being approached. In two states, Georgia and New Jersey, all of the trail is protected in public lands. In North Carolina and Tennessee, where the trail follows the state boundary before dipping into North Carolina in the Nantahala National Forest, all but 12 miles of the trail is protected by public lands.

The Trail Conference celebrated the 60th anniversary of the first trail clearing this summer at Bear Mountain, New York. Over 700 hikers from throughout the nation met to honor the volunteer spirit of Benton MacKaye, the New England author and forester who first proposed a trail linking the summits of the Appalachian peaks. MacKaye outlined his proposal in a 1921 issue of the *Journal of the American Institute of Architects*. The New York-New Jersey Trail Conference adopted the idea a year later, and began building the trail in those states — using volunteers only.

In the 14 states which the Appalachian Trail passes through, there are now several thousand people actively involved in trail work, and they need your help. In North Carolina, four clubs work on the trail — including the Carolina Mountain Club, Piedmont Appalachian Trail Hikers, Smoky Mountains Hiking Club, and the Nantahala Hiking Club.

— Tom Dillon
Winston-Salem

Fishing Best In Winter

Big Muskie Madness

Out There And Waiting: *Jimmy Gillespie of Brevard caught this 44-inch muskie weighing 24 pounds last August in the French Broad River just above the Pisgah River Bridge. It took him about 20 minutes to land the fish on 25-pound test line. Muskie fishing is at its best in late fall and winter, and it helps to fish in a drizzling rain or even snow flurries. Muskie feed on bait fish, and a 6-inch silver-and-black Rebel is a favorite lure of many Tar Heel muskie fishermen.*

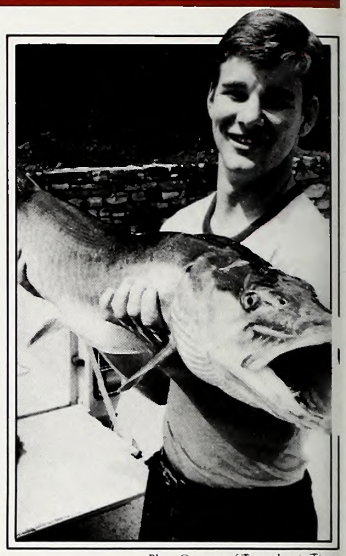


Photo Courtesy of Transylvania Times

Litter Can Kill

Plastic Rings Trap Bass

Dear Sirs:

I have enclosed a picture of a fish caught on Lake Tillery last June in hopes that thoughtless humans who pollute our natural resources and endanger innocent wildlife will consider the consequences of their actions. The fish must have been "wearing" the plastic drink-ring for some time in order for it to grow into him so deeply.

I hiked for a month this summer on the Appalachian Trail in Georgia and North Carolina. It was a very enriching experience, but the most disappointing part of my trip was seeing so much trash left behind and the thoughtless bathroom habits of some people. I think we all need to be reminded that just one piece of trash can spoil another person's experience, and may very well endanger our wildlife as this picture illustrates.

— Mary C. Edwards
Cullowhee

Trash does indeed endanger our wildlife, and the creatures which become trapped in this waste often die a slow and painful death.

Mary Edwards

The Price of Carelessness: *This largemouth bass was caught on Lake Tillery last summer, and unfortunately, this is not an especially uncommon sight. If you pack it in, pack it out.*

A Literary Feast
Cookbooks Make Great Christmas Gifts

In recent years, more and more sportsmen have been learning how to cook rather than leaving that choice to other members of the family. Indeed, game and fish cookery is a natural and pleasant extension of hunting and fishing. For the sporting cook in your family, here are a few books that would fit a stocking just fine on Christmas morning.

The Great Southern Wild Game Cook Book by Sam Goolsby. Published by Pelican Publishing Co., Gretna, LA. 191 pp. with illustrations. $13.95.

The Great Southern Wild Game Cook Book features wild-game cooking, southern-style. It has an extensive selection of venison recipes, and also offers ample coverage of small game, waterfowl, seafood and freshwater fish as well as domestic meats. Treatment of sauces and marinades, vegetable dishes, breads and stuffings, and classic southern desserts is more extensive than most wild-game cook books. The recipes are easily followed.

The Bounty of the Earth Cookbook by Sylvia Bashline. Published by the Winchester Press, P.O. Box 1260, Tulsa, Oklahoma 74101. 226 pp., with illustrations. $10.95.

Sylvia Bashline is Food Editor for *Field and Stream* magazine, and her easy writing style and delicious recipes have garnered her scores of admirers. Readers won't be disappointed in this, her first book. Her recipes are simple, proven, and easily prepared — an asset to anyone's kitchen.

Care and Cooking of Fish and Game by John Weiss. Published by the Winchester Press, P.O. Box 1260, Tulsa, Oklahoma 74101. 252 pp. with illustrations. $10.95.

This is a complete, straight-forward, no-nonsense guide on what to do after you've caught fish or bagged game. Its pages contain complete information on field dressing, butchering, transporting, freezing and storage of wild game and fish. Methods of cooking and recipes included are tried-and-true favorites of sportsmen across the United States. Written by a hunter-fisherman for hunters and fishermen, it is a valuable addition to the sportsman's library.

Complete Fish and Game Cookery of North America by Frances MacIlquham. Published by the Winchester Press, 220 Old New Brunswick Rd., Piscataway, New Jersey 08854. Large format, 104 pp. with drawings and color and black-and-white photos. $29.95.

This is undoubtedly one of the most comprehensive volumes available dealing with American fish and game cookery. The lore, recipes and cooking methods combine to make it more than a good cookbook. The book also traces the development of food preparation as an art — from the aboriginal methods of Native Americans and Eskimos to the many ethnic influences that have helped shape North American cuisine. Treatment of regional cooking methods, the wide variety of recipes, and the insights into the history of wild-game cooking in North America make fascinating reading.

— *Curtis Wooten*

Use The Nongame Checkoff
Help Wildlife At Tax Time

Tax time is approaching, and this year North Carolinians will have an opportunity to do something good for wildlife through their tax returns. The recently enacted nongame tax-refund checkoff allows Tar Heels to donate a part or all of the refund on their state income-tax returns to be used for the management and protection of nongame and endangered wildlife. Simply fill in the amount that you desire to donate to this program in the special box on your state income-tax form.

"Funds raised through this checkoff are badly needed, and will be used in a variety of nongame and endangered species programs," said Debbie Paul, assistant to the executive director of the N.C. Wildlife Resources Commission. "We have several endangered species programs that will benefit from this new source of funding — including our efforts to introduce bald eagles to North Carolina at the Lake Mattamuskeet National Wildlife Refuge, and an active management and protection program for endangered sea turtles. With the reduction in federal funding available for endangered-species programs, the nongame tax-refund checkoff fills a vital need.

"There are a host of other wildlife programs that will also benefit from the tax-checkoff program," said Vernon Bevill, executive director of the Wildlife Commission. "These funds will help support a comprehensive environmental-education program for our schools. Funds may also be used for establishing urban wildlife areas, studies of nongame and endangered species, and many other activities. We're very optimistic about this program, and expect it to do well in North Carolina. Currently, 28 other states have nongame tax-refund checkoff programs. Virginia raised over $370,000 for nongame wildlife in the first year of its program, and New York raised over $1.7 million for nongame wildlife last year as its program began. The nongame tax-refund checkoff is one of the best things to ever happen to wildlife in this State, and we're especially interested in working with the public and with people who prepare tax returns for a living to make this program a success."

Information on nongame programs and the nongame tax-refund checkoff is available from the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

Populations Declining

Wary Black Duck Faces An Uncertain Future

Waterfowl hunters along the Eastern Seaboard have traditionally considered the black duck a prize — one of the wariest of waterfowl, and a delicacy on the dinner table. There is growing evidence, however, that the black duck is in trouble — and for a variety of reasons. Over the past few decades, the population of this fine game bird has steadily dwindled. In an effort to stabilize black duck populations, the U.S. Fish and Wildlife Service and individual states within the Atlantic Flyway have agreed to shorten hunting seasons and reduce bag limits to reduce the harvest of black ducks in the Atlantic Flyway by 25 percent. In North Carolina, the hunting season for black ducks will run from December 28 through January 20, and hunters will be allowed to takeonly one black duck daily.

"In the past 30 years, the population of black ducks in the United States and Canada has dropped from five million to less than two million birds," said Grady Barnes, section manager for research and regulations for the Division of Wildlife Management of the N.C. Wildlife Resources Commission. "This represents a steady population decline of about 1.5 percent per year. Population fluctuations are normal, but this steady erosion of a waterfowl population is certainly cause for alarm."

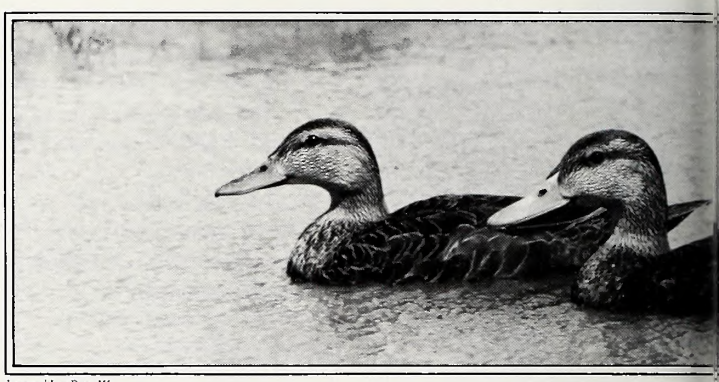
The factors which are affecting black duck populations are complex and not fully understood. However, wildlife biologists feel that acid rain, hybridization of black ducks with mallards, and heavy hunting pressure are all playing a part in the decline of the black duck.

"Acid rain is hurting black ducks by lowering the quality and productivity of their nesting and breeding habitat, said Barnes. "Most black ducks nest in the forests of eastern Canada and New England, and this region has been hit hard by acid rain. Black ducks — both young and adults — feed heavily on aquatic insects and other invertebrates in these northern marshes, and acid rain has killed much of this aquatic life. Since the overall productivity of these marshes is lower because of acid rain, the region just can't support the numbers of black ducks that it did in the past."

Acid rain, however, is not the only factor affecting the black duck. Hybridization of black ducks with mallards is a serious and growing problem.

The mallard and the black duck are closely related. However, the birds differ in habits and ranges. The mallard is originally a prairie bird while the black duck inhabited coastal salt marshes and swamps in eastern forests. Changes in land-use have introduced mallards into areas which were formerly black duck ranges, and the two species readily hybridized. Unlike most hybrids, the offspring from a black duck-mallard cross are fertile and continue to breed. In some areas where black ducks and mallards are found together, up to 10 percent of the birds are hybrids.

"Traditionally, the eastern forests always formed a barrier between mallards and black ducks," said Barnes. "As large blocks of forest were cleared for agriculture and other uses, mallards moved into these areas and encroached on the black duck's range. The release of domesticated, pen-raised mallards compounded the problem. These birds readily hybridize with the black duck, and the hybrid offspring lose the wild traits associated with the black ducks. The black duck also has much more specific habitat needs than the more adaptable mallard. In areas where the two are found together, mallard and hybrid populations generally grow and black duck populations decline. With this declining population of black ducks and the increased hybridization with mallards, we fear that the black duck could be 'genetically swamped.' Eventually, the black duck could even disappear as a species if the situation continues."



Leonard Lee Rue, III

Tough Sledding: *The black duck has long been a favorite of eastern waterfowl hunters, but the population of this wary duck has been declining steadily.*

A final factor in the decline of the black duck is hunting pressure. The black duck is the leading bird in the waterfowl harvest of most northeastern states, and usually ranks fourth or fifth in North Carolina with an average of 10,000 birds taken annually. A U.S. Fish and Wildlife Service study conducted from 1976 to 1980 showed that hunting mortality was high for young black ducks. In some areas, 64 percent of the young female black ducks were killed annually by hunters in contrast to 46 percent of the young female mallards. By reducing the harvest of young black ducks — especially breeding-age females — biologists hope to stabilize the population. Shorter seasons in North Carolina will also help protect small resident populations of black ducks which breed and winter in coastal salt marshes from New Bern north through Currituck Sound.

"We hope that reducing the harvest of black ducks by 25 percent within the Atlantic Flyway will halt their continued decline," said Barnes. "Problems with hybridization and acid rain will continue, but hunting is the only factor over which we have any control. If the decline continues at its current rate, further cutbacks in hunting seasons and bag limits may have to be made in the future."

Waterfowl biologists feel that a limited harvest of black ducks will not hurt the population, but add that

hunters must scrupulously obey the new regulations. Last fall, a humane organization filed an injunction to halt the hunting of black ducks. The injunction was denied. However, biologists expect further suits in the future, and add that it is imperative that hunters obey regulations, and that harvest guidelines not be exceeded by illegal hunting.

"Whether hunters will be allowed to hunt black ducks in the future depends heavily on how well they obey the new regulations," said Barnes. "One possible problem is that it is easy to confuse a hen mallard with a black duck, and hunters will have to learn to make this distinction so they won't shoot black ducks out of season."

Barnes offers the following tips for identifying hen mallards and black ducks:

— The black duck is uniformly dark. The only noticeable white on its body is on the undersides of its wings, which contrast sharply with its darker body.

— The belly of the hen mallard is white while the belly of the black duck is dark.

— The hen mallard has distinctive white borders along the upper and lower edges of the blue patches (speculums) on its wings.

Biologist Explains

Turtles Not Amphibians

Dear Sirs:

A minor error appeared in my article on doves entitled "An Uncommon Bird," which was published in the September issue of *Wildlife In North Carolina.* The first paragraph referred to the "voice of the turtle, meaning dove and not amphibian."

Being a wildlife biologist, I'm concerned that folks might think I don't know my critters. The turtle is a reptile, not an amphibian. Amphibians are equipped with both lung and gill systems, while reptiles have only lungs. Being a reptile, the turtle has no gills, but can hold its breath underwater for uncommon lengths of time.

— Carl Betsill

The reference to turtles as amphibians was not originally in Carl's fine article, but was added by an editor who will be held underwater for an uncommon length of time.

Big Bucks From Bows

What is bowhunting worth? Over $1.3 billion annually to the nation's economy, according to a recent survey conducted by the American Archery Council.

The biggest expense for the nation's 1,250,000 bowhunters is gasoline. On the average, a bowhunter will spend slightly over $300 per year fueling his vehicle. This is followed by equipment at $90 per year, and food at $85 per year.

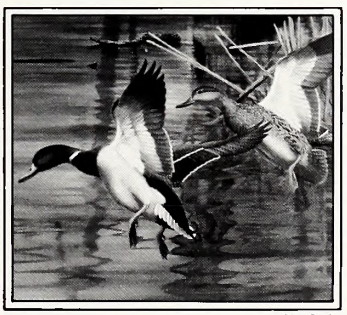
State Stamp Nets $400,000

First State Duck Stamp A Winner

The N.C. Wildlife Resources Commission has established one of the most successful State waterfowl stamp programs in history — ranking second only to the 1981 Texas program. North Carolina's first waterfowl stamp features a pair of hen and drake mallards rising from a marsh. It was done by nationally known wildlife artist Richard Plasschaert of Minnesota.

"Our first-of-State print pre-sold 13,652 regular edition prints," said Vernon Bevill, executive director of the Wildlife Commission. "All of the prints of the 1983 voluntary waterfowl stamp have been sold and delivered. The Wildlife Commission expects to receive over $400,000 from the sale of these prints and stamps, and all of this money will be used for waterfowl conservation in North Carolina."

"The first State waterfowl stamp print program was a tremendous success, and far exceeded our expectations," said Sid Baynes, chief of the Wildlife Commission's Division of Conservation Education and administrator of the duck stamp program. "Originally, we had hoped to sell 8,000 to 10,000 prints, and raise about $250,000 for waterfowl conservation in the State. However, thanks to the strong support shown by individual sportsmen and conservation organizations, we were able to sell far more prints than anticipated. Prints are now available only through private sales from individuals and art dealers which will be higher than the original issue price of $135 each. Those sportsmen who showed their faith in this program and their dedication to waterfowl conservation by purchasing one of these beautiful prints will be rewarded as the prints continue to appreciate in value in the future."



Ken Taylor

A Sell-Out: *North Carolina's first-of-state waterfowl stamp was a tremendous success, and all of the art prints of the stamp have been sold. Over $400,000 was raised for waterfowl management in North Carolina through this program.*

"Waterfowl stamps are still available from the Commission's License Section and from hunting and fishing license agents," added Baynes. "Stamps cost $5.50 each, and, like the prints, should be a good investment. Our License Section has set aside a supply of individual stamps as well as plate-blocks of four stamps at a cost of $22 and entire sheets of 30 stamps for $165. Anyone interested in purchasing these stamps for collection purposes should contact the N.C. Wildlife Resources Commission, License Section, 512 N. Salisbury St., Raleigh, N.C. 27611."

Help Wildlife And Beautify Your Home

Put A Sportsman's Print Under The Tree

One For The Wall: *A print of North Carolina's 1983 sportsman's stamp would be a welcome Christmas gift for any outdoorsman. The painting was done by well-known wildlife artist Duane Raver. The image-size is 6-1/2 by 9 inches, and orders for this one-time, limited edition will be accepted through March 31, 1984. The cost of a print is $90. Also, sportsman's stamps which*

Ken Taylor

are not sold by June 30, 1984, will be available to collectors for $7.50 each. This print of North Carolina's stamp is expected to appreciate in value considerably in the future, and a royalty from the sale of each print will be donated to the Wildlife Commission, and will be used for wildlife conservation. These prints are not being sold by the Wildlife Commission, but are available from art dealers throughout North Carolina.

Only $5

1983-84 North Carolina Wildlife Calendar

Six nationally known wildlife artists have contributed fine outdoor and wildlife paintings to the 1983-84 calendar. Their paintings are in museums and private collections throughout the country, and you've seen examples of some of their work in WILDLIFE IN NORTH CAROLINA magazine. This calendar is almost certain to become a valuable collector's item with such artists featured as:

- Bob Binks
- Bob Dance
- Cecil Eakins
- Larry Barton
- Duane Raver
- Lee LeBlanc

Calendars are $5 each; however, if you purchase 50 or more, we will sell them to you for only $4 each.

This is a project of the Chairman's Wildlife Advisory Committee, a group of North Carolina conservation leaders who have been appointed by the Chairman of the Wildlife Resources Commission to provide information, guidance and support for the agency's wildlife conservation programs. Proceeds from the calendar will go for these purposes.

Yes, please send me _____ copies of the North Carolina Wildlife Calendar. I have enclosed cash, check or money order for _____. We do not bill.

Name _____

Street _____

City _____ State _____ Zip _____

Phone Number (including area code) _____

Return form and payment to Chairman's Wildlife Advisory Committee, care of George Mason, P.O. Box 473, Dallas, N.C. 28034 or give the form to a member of the committee. Checks should be made out to the Chairman's Wildlife Advisory Committee.

Walking the Uwharries

Guide To The Uwharrie Trail by G. Nicholas Hancock. Published by Happy Feat Publishing, P.O. Box 2821, Asheboro, N.C. 27203. Softcover, 77 pp. Cost (includes mailing) for guidebook and accompanying map is $7.28 from publishing company. Guidebook alone is $5 and map is $2 from area backpacking and book stores.

This new guidebook to the Uwharrie Trail is living proof that good things sometimes come in small packages. It includes detailed information on campsites, sources of water, trailheads, parking, distances and other features of the 33-mile Uwharrie Trail. An added feature is that 15 day and overnight hikes are listed for the casual hiker and backpacker.

In short, this book is everything a guidebook should be. Its handy pocket-size assures that it can easily be carried in a shirt or jacket. Thousands of Tar Heel hikers will find it a handy tool for exploring an interesting area that lies just beyond our back doors.

Calendar Of Events

December 1-3
North Carolina Wildlife Art Exhibition and Sale at the Cary Village Mall in Cary.

December 10
Winter Canoe Bird Hike at Merchants Millpond State Park in Gates County. See the winter birds from a canoe. Register by calling 919-357-1191.

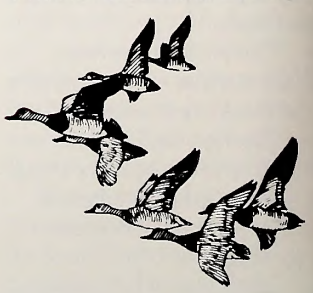
December 10
Christmas Flotilla at Swansboro. Decorated sailboats usher in the Christmas season, also waterfront music.

December 10-23
5th annual 18th Century Christmas Season at the Tryon Palace in New Bern.

December 13
Christmas at Old Salem in Winston-Salem. Recreation of the town as it would have been around Christmas in the early 1800s.

December 17
80th anniversary First Flight Celebration at the Wright Brothers National Memorial at Kill Devil Hills. For more information, contact the First Flight Society, P.O. Box 1903, Kitty Hawk, N.C. 27949.

December 18
Colonial Christmas and Candlelighting Service at the Schiele Museum in Gastonia.



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